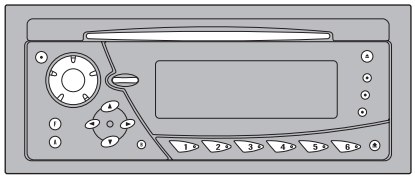
Service Manual

DEH-P77DH/X1M/UC



ORDER NO.
CRT2455

MULTI-CD CONTROL HIGH POWER CD PLAYER WITH FM/AM TUNER

DEH-P77DH X1M/UC

DEH-P47DH X1M/UC

● **This service manual should be used together with the following manual(s):**

Model No.	Order No.	Mech. Module	Remarks
CX-958	CRT2423	S8.1	CD Mech. Module:Circuit Description, Mech. Description, Disassembly

CONTENTS

PIONEER CORPORATION 4-1, Meguro 1-Chome, Meguro-ku, Tokyo 153-8654, Japan
PIONEER ELECTRONICS SERVICE INC. P.O.Box 1760, Long Beach, CA 90801-1760 U.S.A.
PIONEER EUROPE N.V. Haven 1087 Keetberglaan 1, 9120 Melsele, Belgium
PIONEER ELECTRONICS ASIACENTRE PTE.LTD. 253 Alexandra Road, #04-01, Singapore 159936

K-ZZA. FEB. 2000 Printed in Japan

● **CD Player Service Precautions**

1. For pickup unit(CXX1285) handling, please refer to"Disassembly"(see page 54).
   During replacement, handling precautions shall be taken to prevent an electrostatic discharge(protection by a short pin).
2. During disassembly, be sure to turn the power off since an internal IC might be destroyed when a connector is plugged or unplugged.
3. Please checking the grating after changing the service pickup unit(see page 49).

1. SAFETY INFORMATION

CAUTION

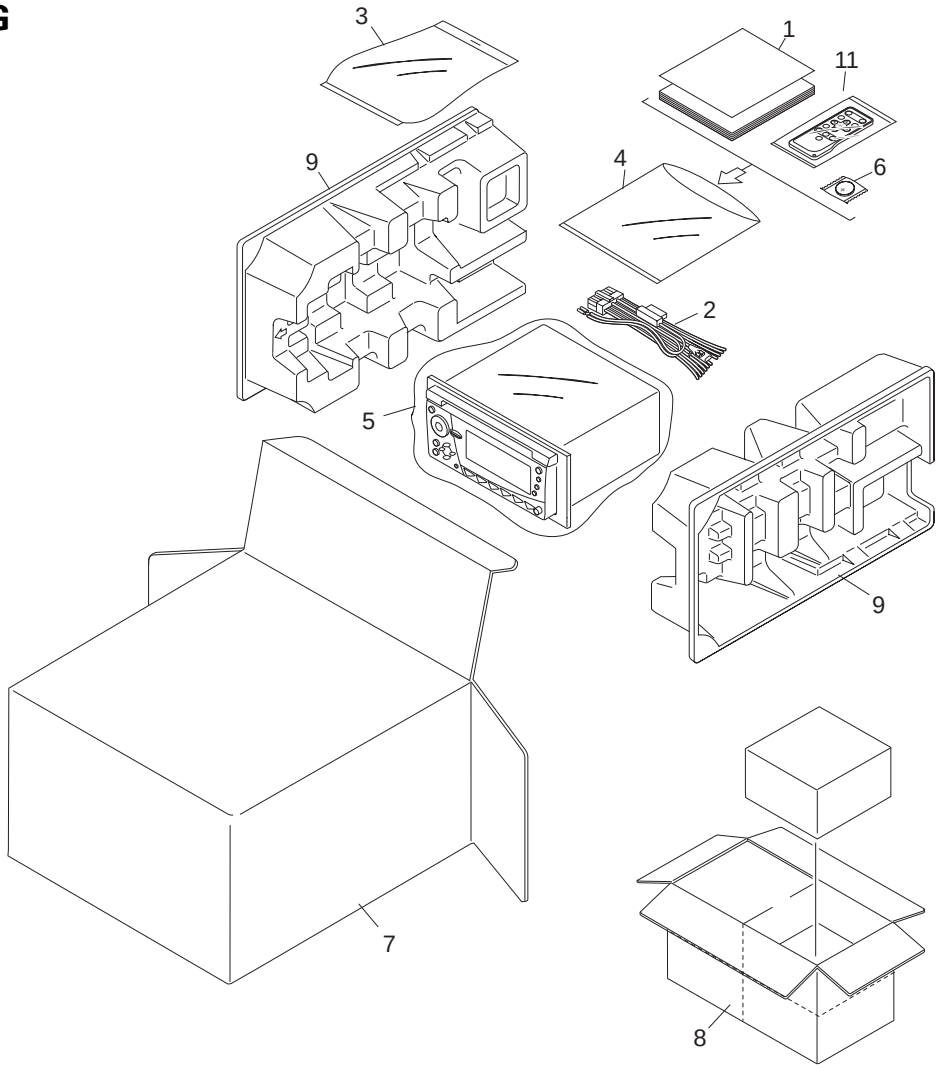
This service manual is intended for qualified service technicians; it is not meant for the casual do-it-yourselfer.
Qualified technicians have the necessary test equipment and tools, and have been trained to properly and safely repair complex products such as those covered by this manual.
Improperly performed repairs can adversely affect the safety and reliability of the product and may void the warranty.
If you are not qualified to perform the repair of this product properly and safely; you should not risk trying to do so and refer the repair to a qualified service technician.

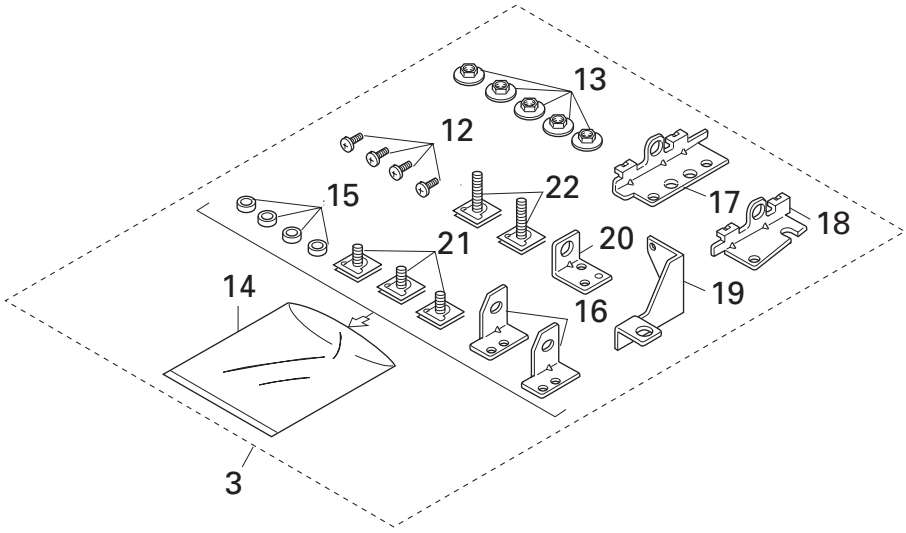
WARNING

This product contains lead in solder and certain electrical parts contain chemicals which are known to the state of California to cause cancer, birth defects or other reproductive harm.
Health & Safety Code Section 25249.6 - Proposition 65

2. EXPLODED VIEWS AND PARTS LIST

2.1 PACKING





NOTE:

- Parts marked by "*" are generally unavailable because they are not in our Master Spare Parts List.
- Screws adjacent to ∇ mark on the product are used for disassembly.

(1) PACKING SECTION PARTS LIST

Mark	No.	Description	Part No.
*	1-1	Card	ARY1048
	1-2	Owner's Manual	See Contrast table(2)
	1-3	Installation Manual	See Contrast table(2)
*	1-4	Label	CRW1343
	2	Cord Assy	CDE6216
	3	Accessory Assy	CEA2006
	4	Polyethylene Bag	CEG1116
*	5	Polyethylene Bag	CEG1272
	6	Battery	See Contrast table(2)
	7	Carton	See Contrast table(2)
	8	Contain Box	See Contrast table(2)
	9	Protector	CHP2255
	10	•••••	
	11	Remote Control Unit	See Contrast table(2)
	12	Screw	BSZ30P050FMC

Mark	No.	Description	Part No.
	13	Nut	CBN1012
*	14	Polyethylene Bag	CEG1203
	15	Spacer	CLA2598
	16	Bracket	CNC6767
	17	Bracket	CNC5506
	18	Bracket	CNC5507
	19	Bracket	CNC5686
	20	Bracket	CNC5687
	21	Bolt Unit	CXA7960
	22	Bolt Unit	CXA7961

(2) CONTRAST TABLE

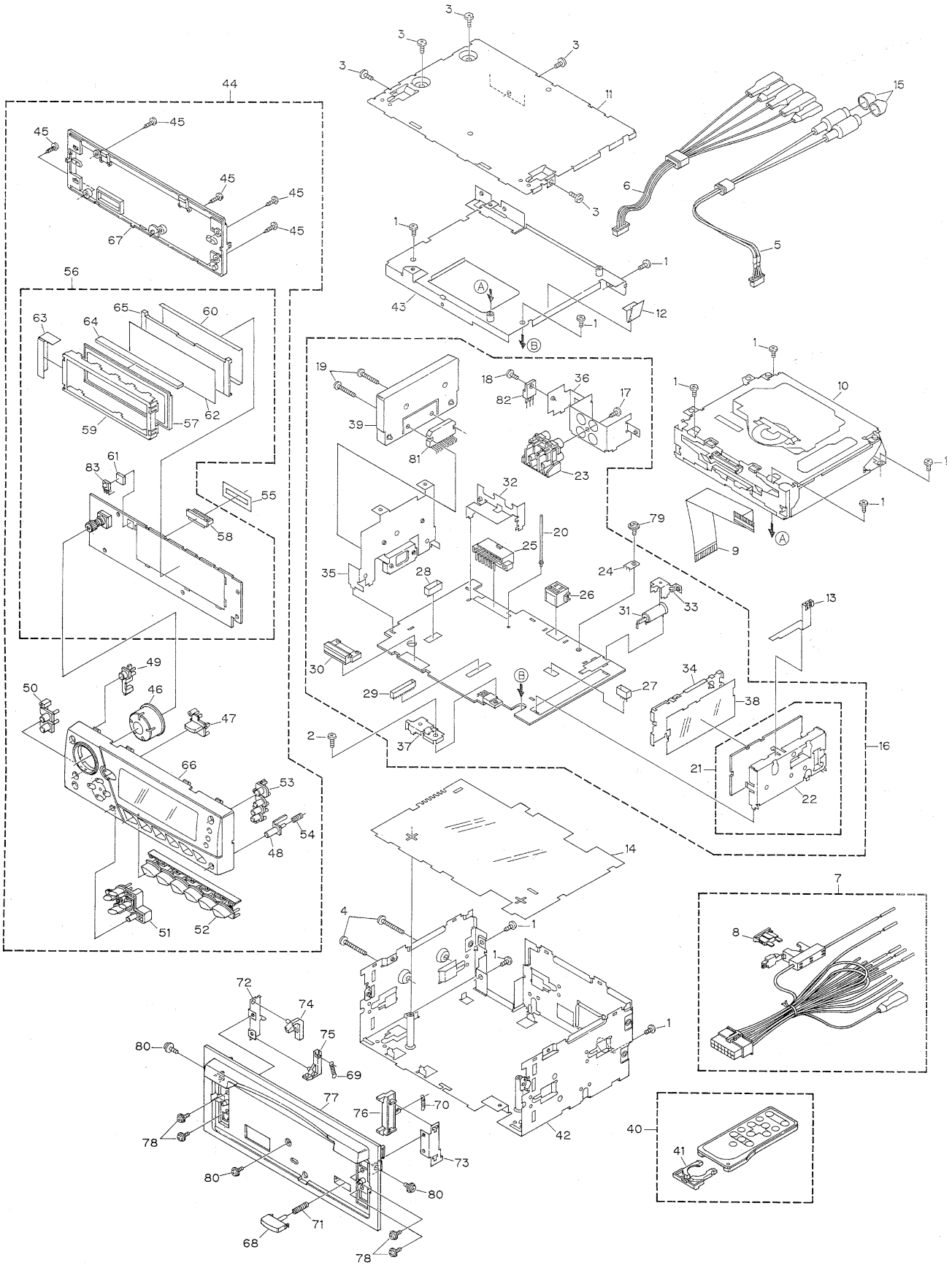
DEH-P77DH/X1M/UC and DEH-P47DH/X1M/UC are constructed the same except for the following:

Mark No.	Symbol and Description	Part No. DEH-P77DH/X1M/UC	Part No. DEH-P47DH/X1M/UC
1-2	Owner's Manual	CRD3176	CRD3178
1-3	Installation Manual	CRD3177	CRD3179
6	Battery	CEX1030	Not used
7	Carton	CHG4025	CHG4026
8	Contain Box	CHL4025	CHL4026
11	Remote Control Unit	CXB4285	Not used

● **Owner's Manual, Installation Manual**

Model	Part No.	Language
DEH-P77DH/X1M/UC	CRD3176	English, French
	CRD3177	English, French
DEH-P47DH/X1M/UC	CRD3178	English, French
	CRD3179	English, French

2.2 EXTERIOR



(1) EXTERIOR SECTION PARTS LIST

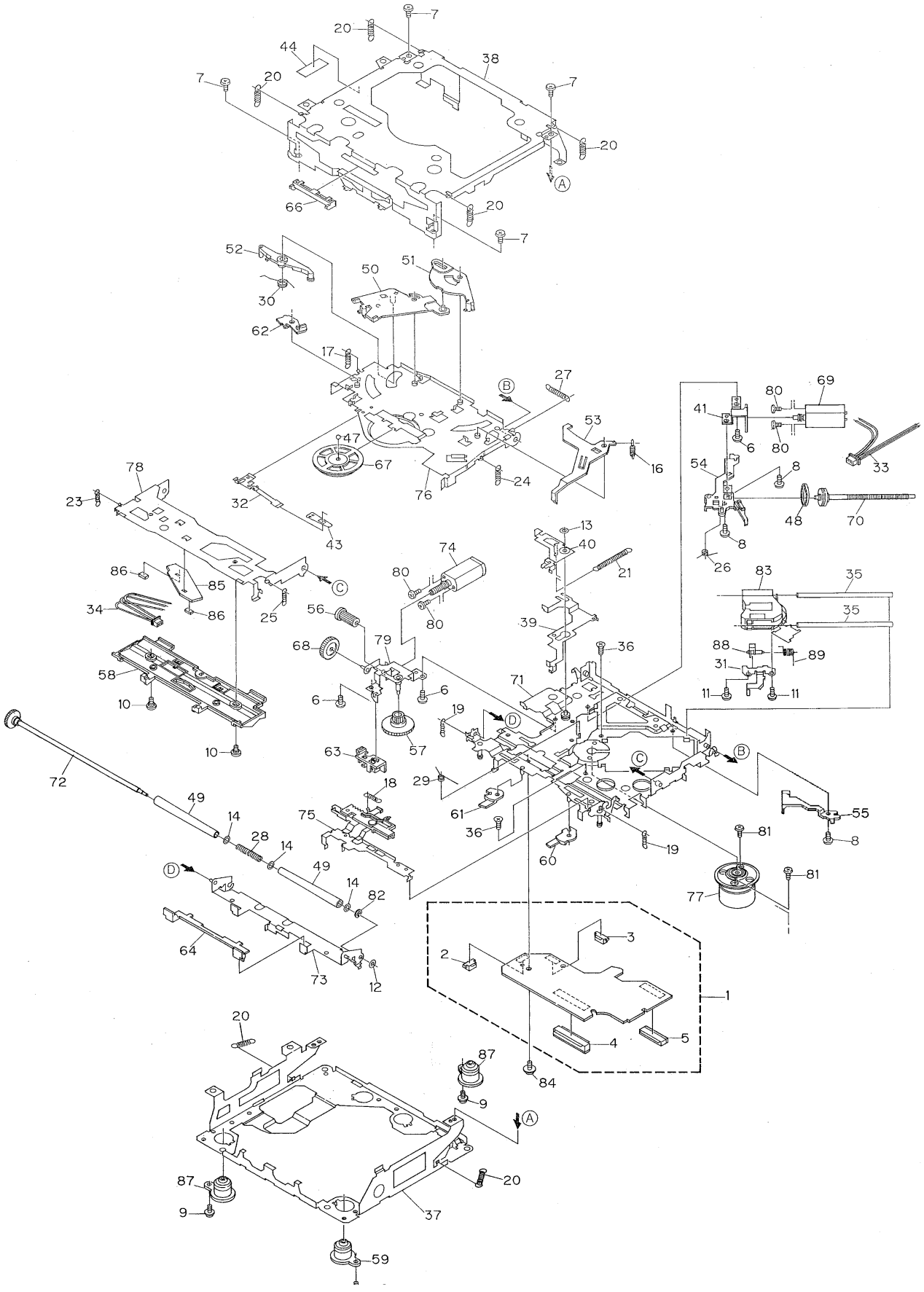
Mark No.	Description	Part No.
1	Screw	BSZ26P060FMC
2	Screw	BSZ26P080FMC
3	Screw	BSZ30P050FMC
4	Screw	BSZ30P200FMC
5	Cord Assy	See Contrast table(2)
6	Cord Assy	See Contrast table(2)
7	Cord Assy	CDE6216
8	Fuse(10A)	CEK1136
9	Cable	CDE6217
10	CD Mechanism Module(S8.1)	CXK5201
11	Case	CNB2468
12	Holder	CNC8754
13	Holder	CNC8755
14	Insulator	CNM6611
15	Cap	See Contrast table(2)
16	Tuner Amp Unit	See Contrast table(2)
17	Screw	BPZ26P100FZK
18	Screw	BSZ26P080FMC
19	Screw	BSZ26P160FMC
20	Clamper	See Contrast table(2)
21	FM/AM Tuner Unit	CWE1501
22	Holder	CNC7532
23	Pin Jack(CN433)	See Contrast table(2)
24	Terminal(CN501)	CKF1059
25	Plug(CN951)	CKM1319
26	Connector(CN411)	CKS3408
27	Connector(CN431)	See Contrast table(2)
28	Connector(CN952)	See Contrast table(2)
29	Connector(CN681)	CKS3706
30	Connector(CN651)	CKS4246
31	Antenna Jack(CN502)	CKX1056
32	Holder	See Contrast table(2)
33	Holder	CNC7001
34	Holder	CNC7533
35	Holder	CNC8278
36	Holder	See Contrast table(2)
37	Holder	CNC8691
38	Insulator	CNM5967
39	Heat Sink	CNR1435
40	Remote Control Unit	See Contrast table(2)
41	Cover	See Contrast table(2)
42	Chassis Unit	See Contrast table(2)
43	Chassis Unit	CXB5123
44	Detach Grille Assy	See Contrast table(2)
45	Screw	BPZ20P100FZK
46	Knob	CAA1493
47	Button(EEQ)	CAC6449
48	Button(DETACHABLE)	CAC6450
49	Button(SOURCE)	See Contrast table(2)
50	Button(F, A)	See Contrast table(2)
51	Button(SEEK)	See Contrast table(2)
52	Button(1-6)	See Contrast table(2)
53	Button(EJECT)	See Contrast table(2)
54	Spring	CBH2344
55	Sheet	CNM6612
56	Keyboard Unit	See Contrast table(2)
57	LCD	CAW1574
58	Connector(CN901)	CKS4245
59	Holder	CNC8664
60	Sheet	CNM6608
61	Spacer	See Contrast table(2)
62	Sheet	CNM6752
63	Sheet	CNM6856
64	Connector	CNV6098
65	Lighting Conductor	CNV6099
66	Grille Unit	See Contrast table(2)
67	Cover Unit	CXB5195
68	Button	CAC4836
69	Spring	CBH1834
70	Spring	CBH1835
71	Spring	CBH2367
72	Bracket	CNC6135
73	Bracket	CNC6791
74	Arm	CNV4692
75	Arm	CNV4693
76	Arm	CNV4728
77	Panel Unit	See Contrast table(2)
78	Screw	IMS20P040FZK
79	Screw	ISS26P060FMC
80	Screw	ISS26P060FZK
81	IC(IC551)	PAL005A
82	Transistor(Q954)	2SD2396
83	IC(IC902)	TSOP1840SB1

(2) CONTRAST TABLE

DEH-P77DH/X1M/UC and DEH-P47DH/X1M/UC are constructed the same except for the following:

Mark No.	Symbol and Description	Part No.	
		DEH-P77DH/X1M/UC	DEH-P47DH/X1M/UC
5	Cord Assy	CDE6214	Not used
6	Cord Assy	CDE6215	Not used
15	Cap	CNV2680	Not used
16	Tuner Amp Unit	CWM6894	CWM6895
20	Clamper	CEF1009	Not used
23	Pin Jack(CN433)	CKB1043	CKB1042
27	Connector(CN431)	CKS3584	Not used
28	Connector(CN952)	CKS3585	Not used
32	Holder	CNC6880	CNC6893
36	Holder	CNC8689	CNC8690
40	Remote Control Unit	CXB4285	Not used
41	Cover	CNS4948	Not used
42	Chassis Unit	CXB5122	CXB5199
44	Detach Grille Assy	CXB5395	CXB5396
49	Button(SOURCE)	CAC6451	CAC6444
50	Button(F, A)	CAC6452	CAC6445
51	Button(SEEK)	CAC6453	CAC6446
52	Button(1-6)	CAC6454	CAC6447
53	Button(EJECT)	CAC6455	CAC6448
56	Keyboard Unit	CWM6896	CWM7030
61	Spacer	CNM6751	Not used
66	Grille Unit	CXB5125	CXB5124
77	Panel Unit	CXB5198	CXB5197

2.3 CD MECHANISM MODULE

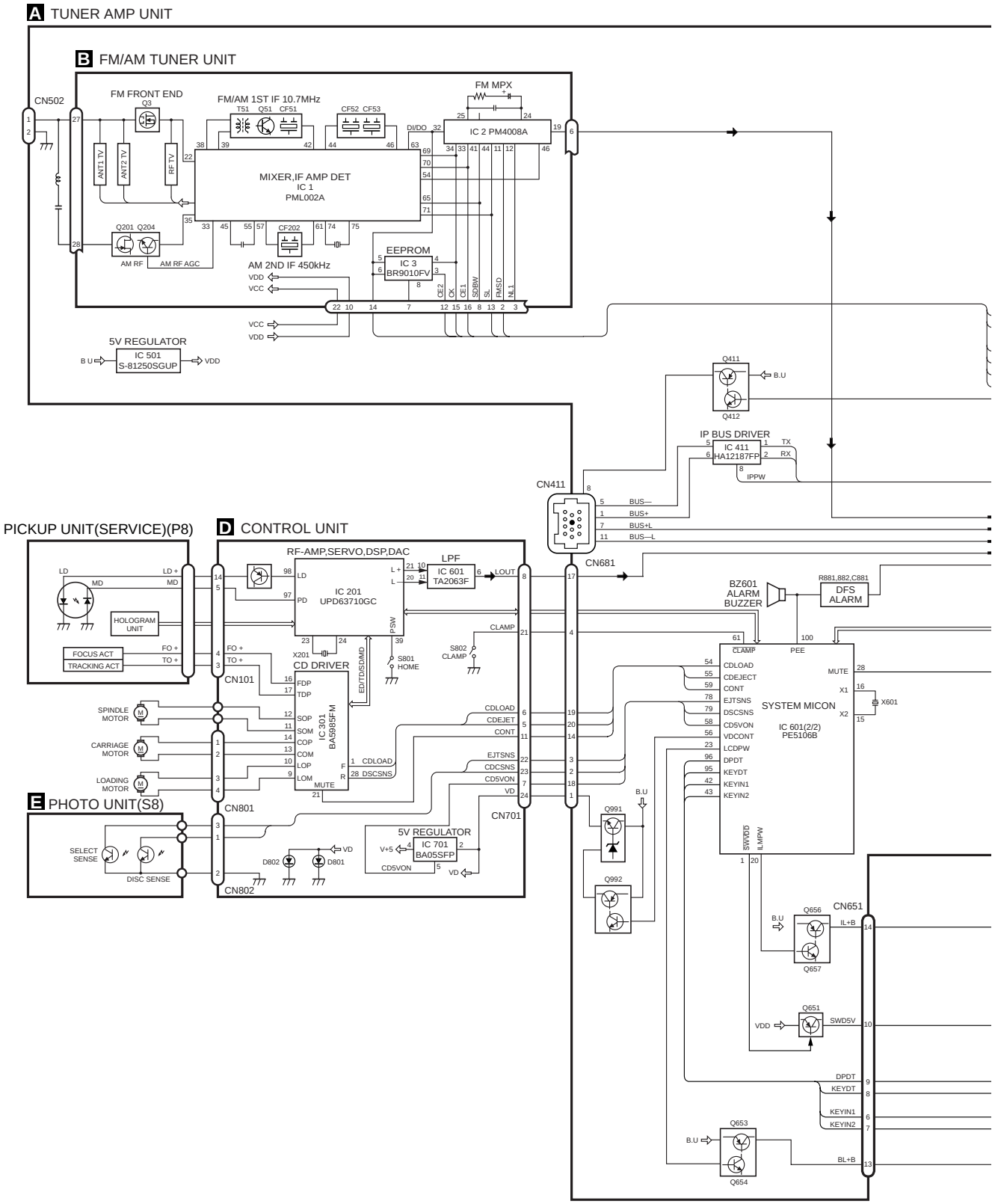


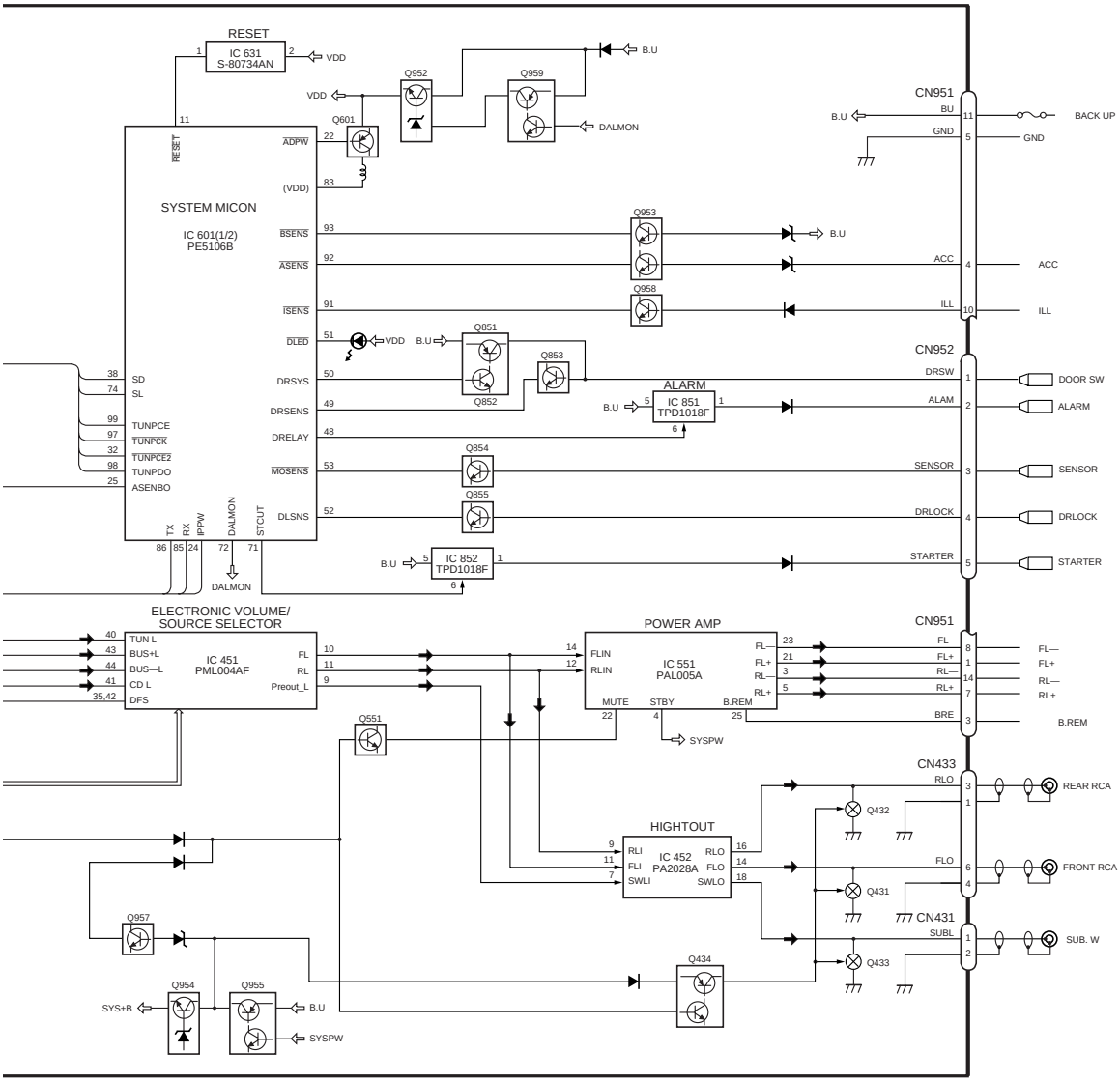
● CD MECHANISM MODULE SECTION PARTS LIST

Mark	No.	Description	Part No.
	1	Control Unit	CWX2411
	2	Connector(CN802)	CKS2192
	3	Connector(CN801)	CKS2193
	4	Connector(CN701)	CKS2773
	5	Connector(CN101)	CKS3486
	6	Screw	BMZ20P030FMC
	7	Screw	BSZ20P040FMC
	8	Screw(M2x3)	CBA1077
	9	Screw(M2x5)	EBA1028
	10	Screw	CBA1243
	11	Screw(M2x4)	CBA1362
	12	Washer	CBF1037
	13	Washer	CBF1038
	14	Washer	CBF1060
	15	•••••	
	16	Spring	CBH2079
	17	Spring	CBH2117
	18	Spring	CBH2314
	19	Spring	CBH2110
	20	Spring	CBH2282
	21	Spring	CBH2318
	22	•••••	
	23	Spring	CBH2324
	24	Spring	CBH2118
	25	Spring	CBH2161
	26	Spring	CBH2163
	27	Spring	CBH2189
	28	Spring	CBH2377
	29	Spring	CBH2260
	30	Spring	CBH2262
	31	Bracket	CNC8568
	32	Spring	CBL1369
	33	Connector	CDE5531
	34	Connector	CDE5532
	35	Shaft	CLA3304
	36	Screw(M2.6x6)	CBA1458
	37	Frame	CNC8565
	38	Frame	CNC8749
	39	Lever	CNC7546
	40	Arm	CNC8663
	41	Bracket	CNC8567
	42	•••••	
	43	Spacer	CNM3315
	44	Sheet	CNM6659
	45	•••••	
	46	•••••	
	47	Ball	CNR1189
	48	Belt	CNT1086
	49	Roller	CNV4509
	50	Arm	CNV6037
	51	Arm	CNV5247
	52	Arm	CNV5248
	53	Arm	CNV5249
	54	Guide	CNV5254
	55	Guide	CNV5255
	56	Gear	CNV5257
	57	Gear	CNV5256
	58	Guide	CNV6272
	59	Damper	CNV6010
	60	Arm	CNV6096
	61	Arm	CNV6031
	62	Arm	CNV6211
	63	Guide	CNV6012
	64	Guide	CNV5510
	65	•••••	
	66	Guide	CNV5751
	67	Clamper	CNV6013
	68	Gear	CNV5813
	69	Motor Unit(M1)	CXB2190
	70	Screw Unit	CXB5892
	71	Chassis Unit	CXB4797
	72	Gear Unit	CXB4728
	73	Arm Unit	CXB5753
	74	Motor Unit(M2)	CXB2195
	75	Lever Unit	CXB4730
	76	Arm Unit	CXB4731
	77	Motor Unit(M3)	CXB2562
	78	Arm Unit	CXB4732
	79	Bracket Unit	CXB4795
	80	Screw	JFZ20P025FMC
	81	Screw	JGZ17P025FZK
	82	Washer	YE20FUC
	83	Pickup Unit(Service)(P8)	CXX1285
	84	Screw	IMS26P030FMC
*	85	PCB	CNX2982
	86	Photo-transistor(Q1, 2)	CPT230SX-TU
	87	Damper	CNV6011
	88	Rack	CNV6014
	89	Spring	CBH2315

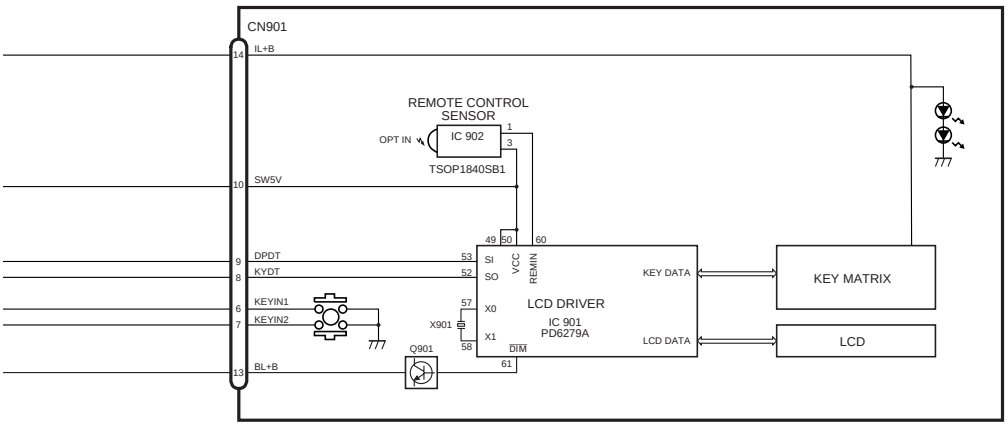
3. BLOCK DIAGRAM AND SCHEMATIC DIAGRAM

3.1 BLOCK DIAGRAM(DEH-P77DH/X1M/UC)



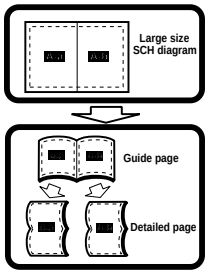


C KEYBOARD UNIT



3.2 OVERALL CONNECTION DIAGRAM(GUIDE PAGE)

Note: When ordering service parts, be sure to refer to "EXPLODED VIEWS AND PARTS LIST" or "ELECTRICAL PARTS LIST".



A-a

A TUNER AMP UNIT

B FM/AM TUNER UNIT

D E CD MECHANISM MODULE

C KEYBOARD UNIT

IP BUS IN

IP-BUS:2.2dBs

FM(100%):-20.5dBs
AM(30%):-31dBs
IP-BUS:2.2dBs
S-CD:4.4dBs

FM(100%):-19.5dBs
AM(30%):-30dBs

5V REGULATOR

IP BUS DRIVER

VD REGULATOR

S-CD:4.4dBs

12.5829MHz

IC601
PE5106B
SYSTEM MIC

NOTE :

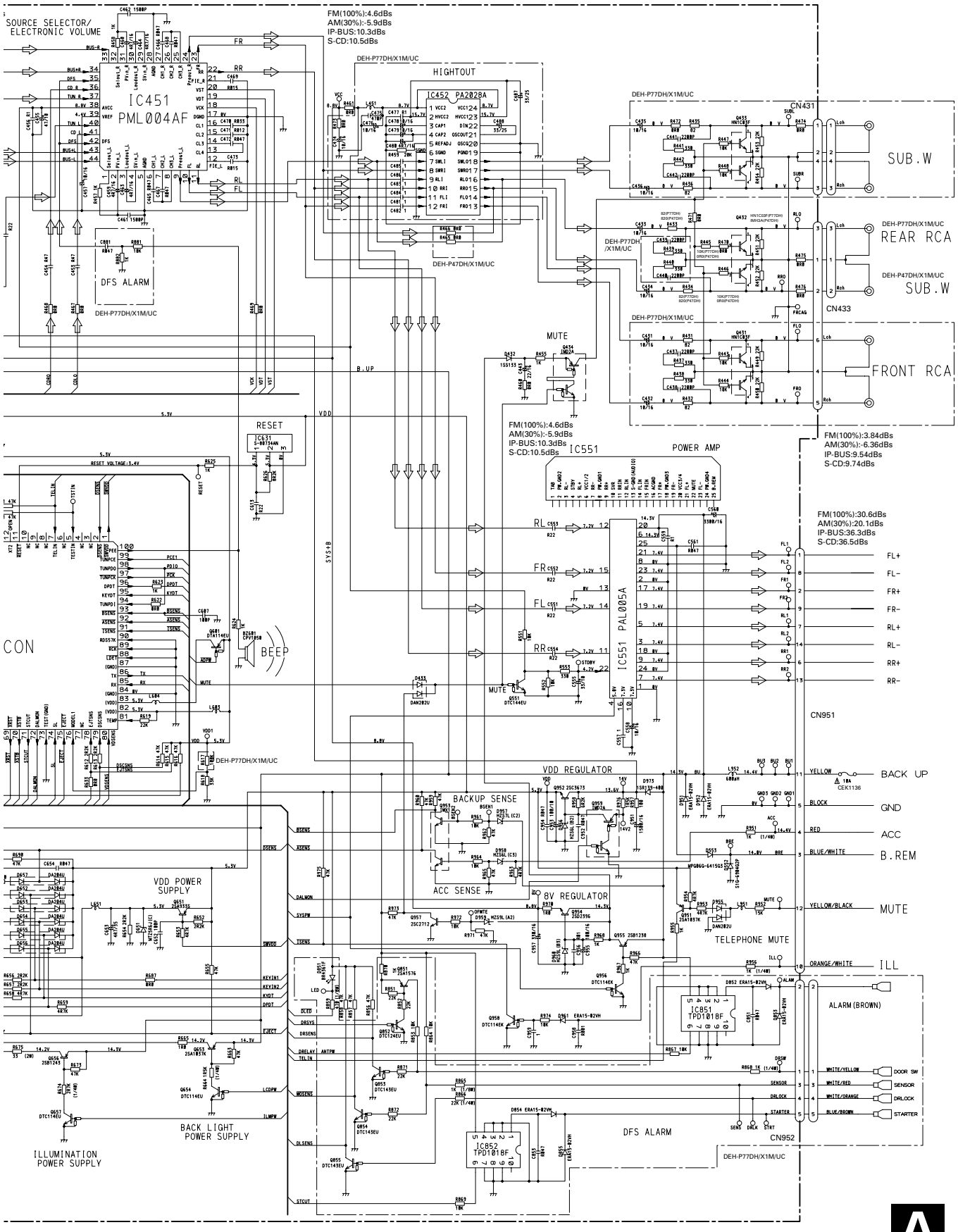
Symbol indicates a resistor. No differentiation is made between chip resistors and discrete resistors.

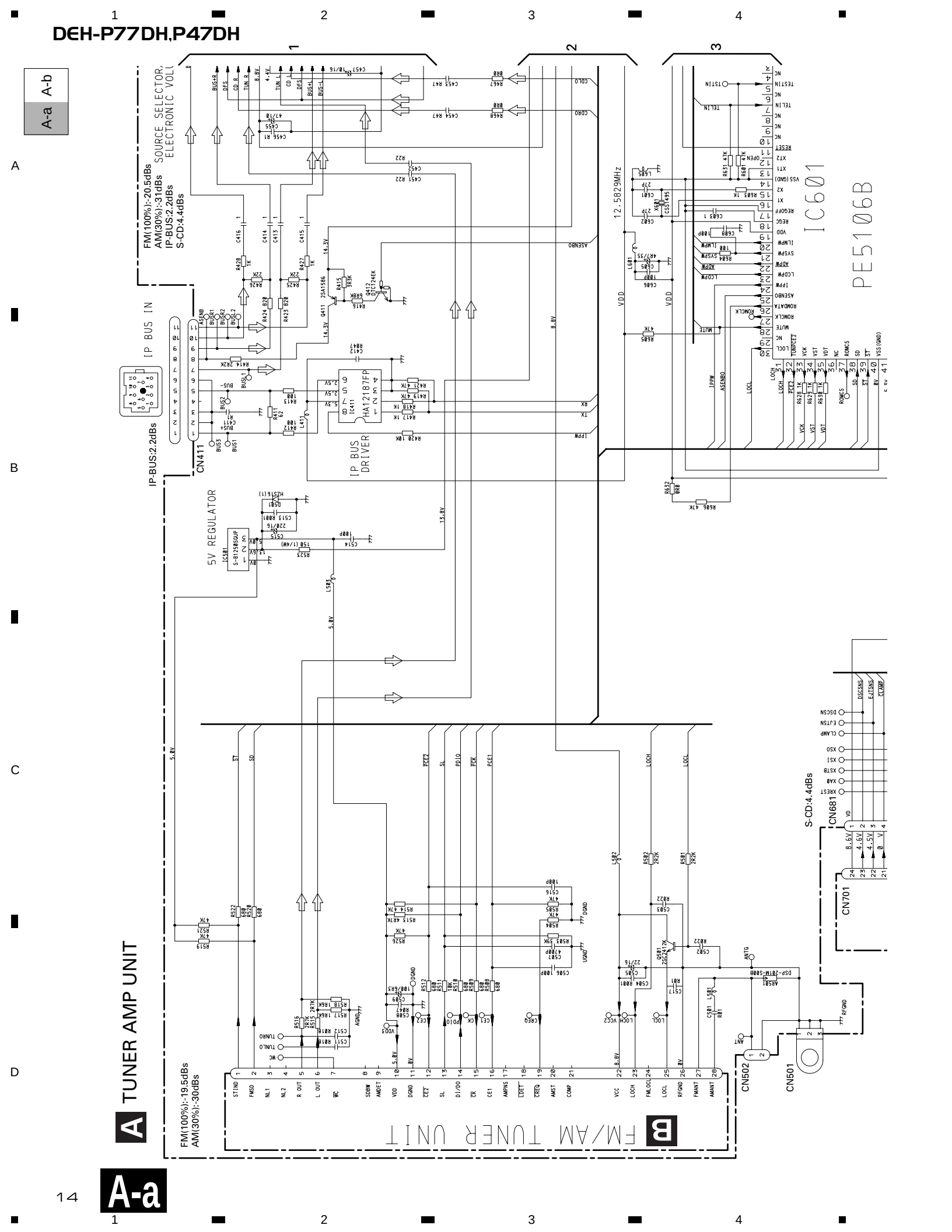
Symbol indicates a capacitor. No differentiation is made between chip capacitors and discrete capacitors.

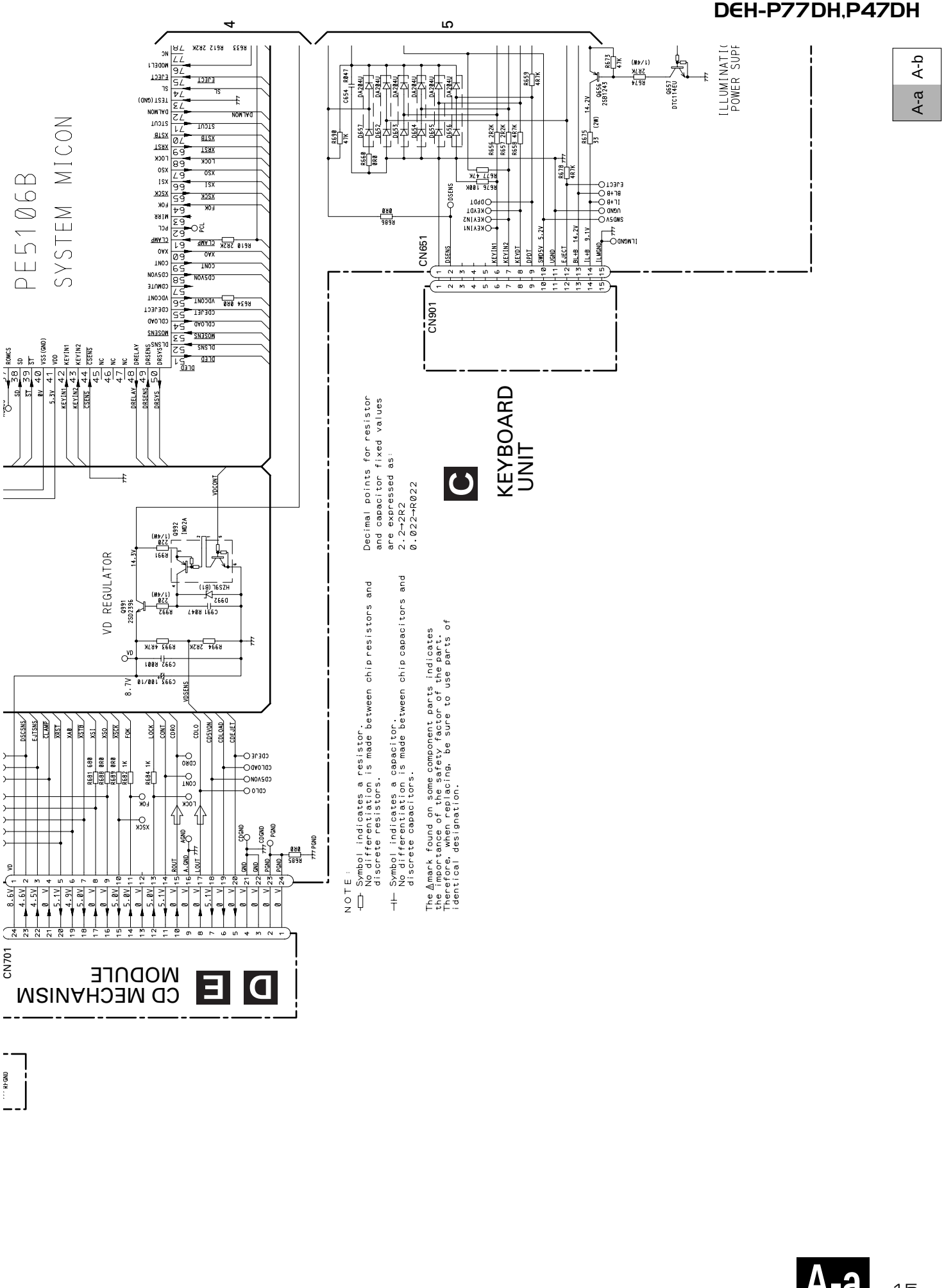
The Δmark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.

Decimal points for resistor and capacitor fixed values are expressed as:
2.2→2R2
0.022→R022

A-b


SOURCE SELECTOR/
ELECTRONIC VOLUME
IC451
PML004AF
FM(100%):4.6dBs
AM(30%):-5.9dBs
IP-BUS:10.3dBs
S-CD:10.5dBs
DEH-P77DH/X1M/UC
HIGHTOUT
IC452 PA2028A
DEH-P47DH/X1M/UC
CN431
SUB.W
REAR RCA
CN433
FRONT RCA
DFS ALARM
MUTE
RESET
IC631
B.UP
VDD
FM(100%):4.6dBs
AM(30%):-5.9dBs
IP-BUS:10.3dBs
S-CD:10.5dBs
IC551
POWER AMP
FM(100%):3.84dBs
AM(30%):-6.36dBs
IP-BUS:9.54dBs
S-CD:9.74dBs
FM(100%):30.6dBs
AM(30%):20.1dBs
IP-BUS:36.3dBs
S-CD:36.5dBs
IC551 PAL005A
CN951
FL+
FL-
FR+
FR-
RL+
RL-
RR+
RR-
CON
BEEP
VDD REGULATOR
BACKUP SENSE
ACC SENSE
8V REGULATOR
TELEPHONE MUTE
BACK UP
GND
ACC
B.REM
MUTE
ILL
ALARM (BROWN)
DOOR SW
SENSOR
DRLOCK
STARTER
VDD POWER
SUPPLY
BACK LIGHT
POWER SUPPLY
ILLUMINATION
POWER SUPPLY
DFS ALARM
CN952


A-b
A-a
SOURCE SELECTOR, ELECTRONIC VOLL
FM(100%):-20.5dBs
AM(30%):-31dBs
IP-BUS:2.2dBs
S-CD:4.4dBs
IP BUS IN
IP-BUS:2.2dBs
CN411
IP BUS DRIVER
IC411
HA12187FP
5V REGULATOR
IC681
S-8125BSGUP
12.5829MHz
IC601
PE5106B
S-CD:4.4dBs
CN681
CN701
CN502
CN501
A TUNER AMP UNIT
FM(100%):-19.5dBs
AM(30%):-30dBs
B FM/AM TUNER UNIT


PE5106B
SYSTEM MICON
CN651
CN901
KEYBOARD UNIT
VD REGULATOR
CD MECHANISM MODULE
CN701
ILLUMINATI(
POWER SUPP
NOTE :
Symbol indicates a resistor.
No differentiation is made between chip resistors and discrete resistors.
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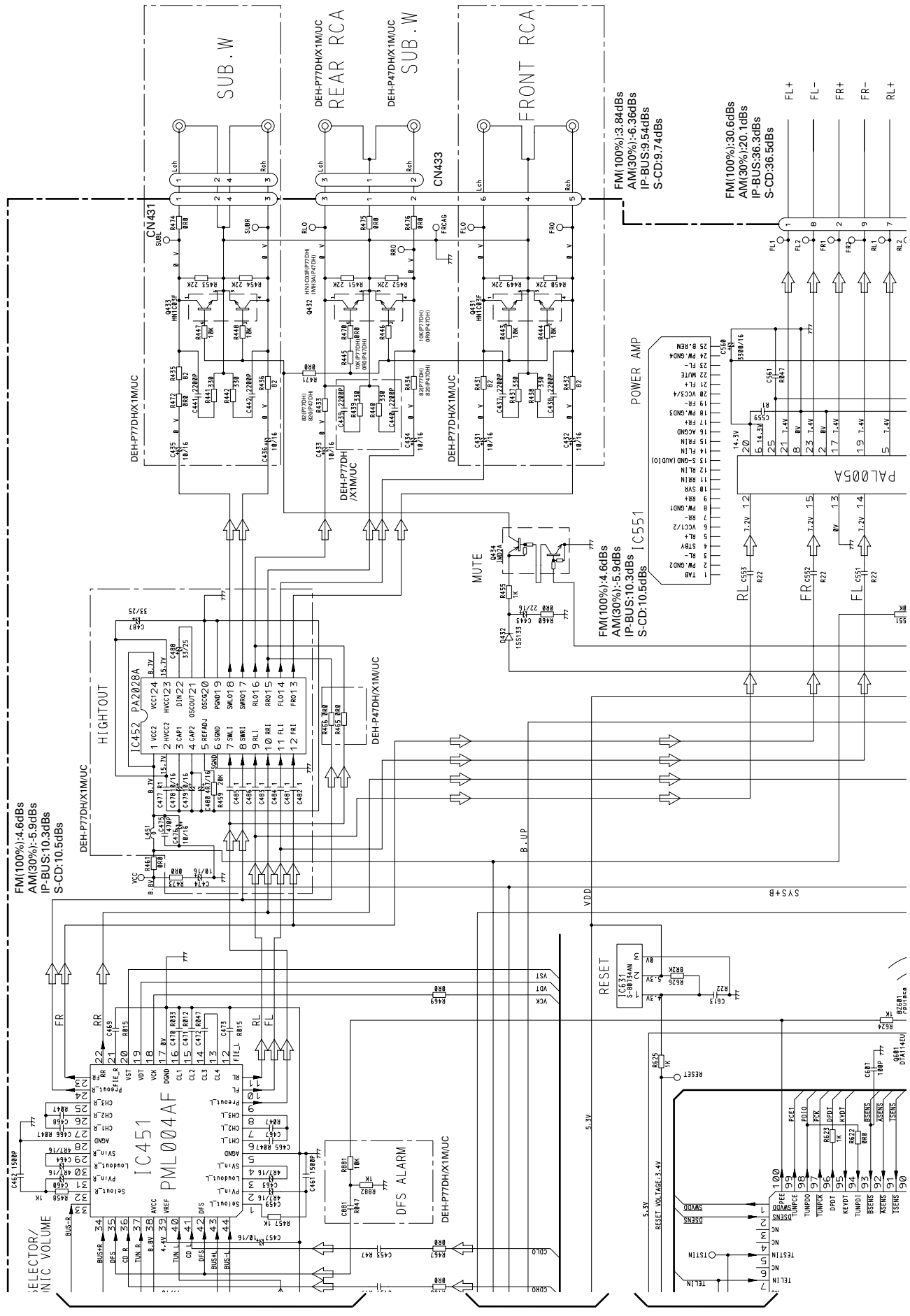
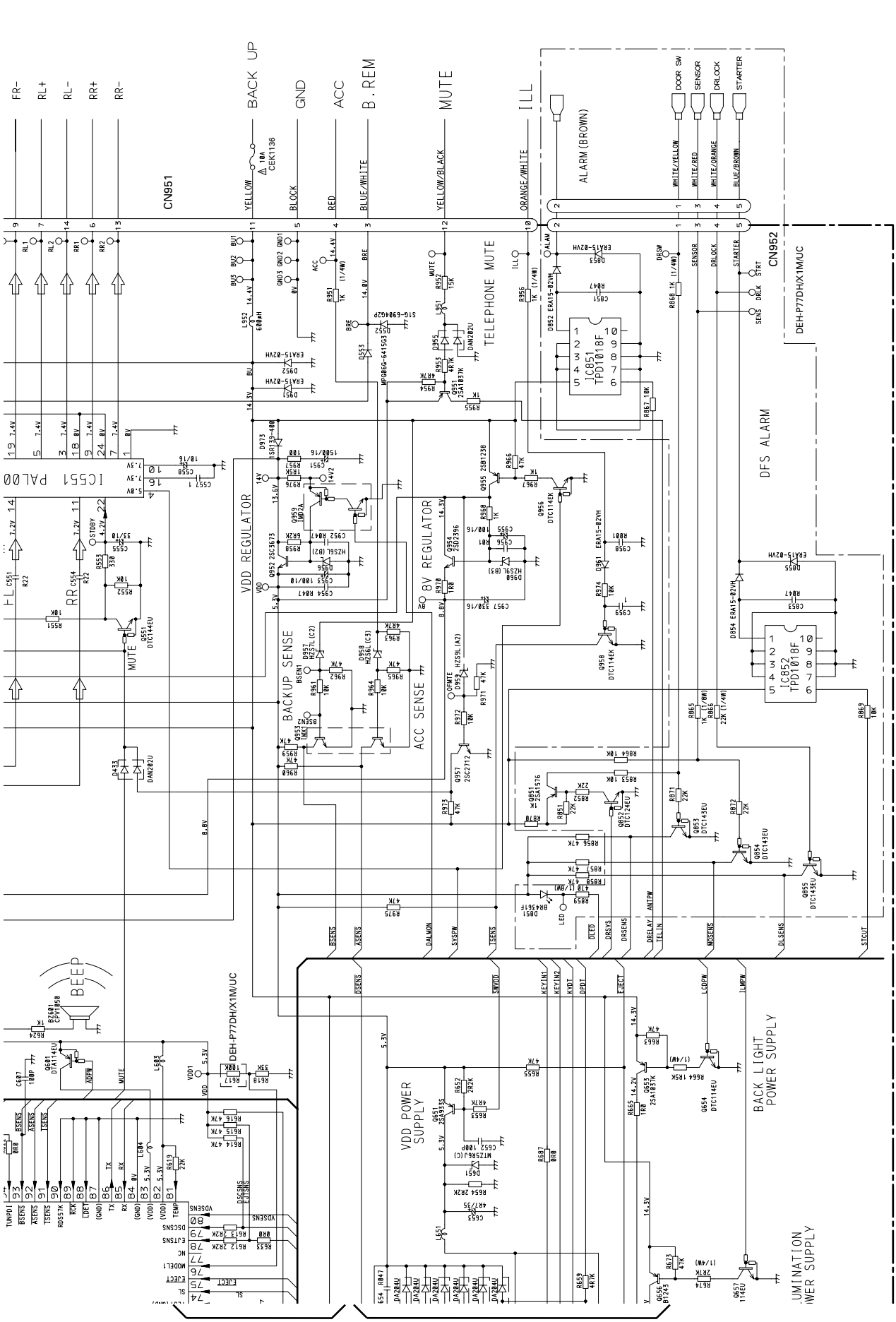
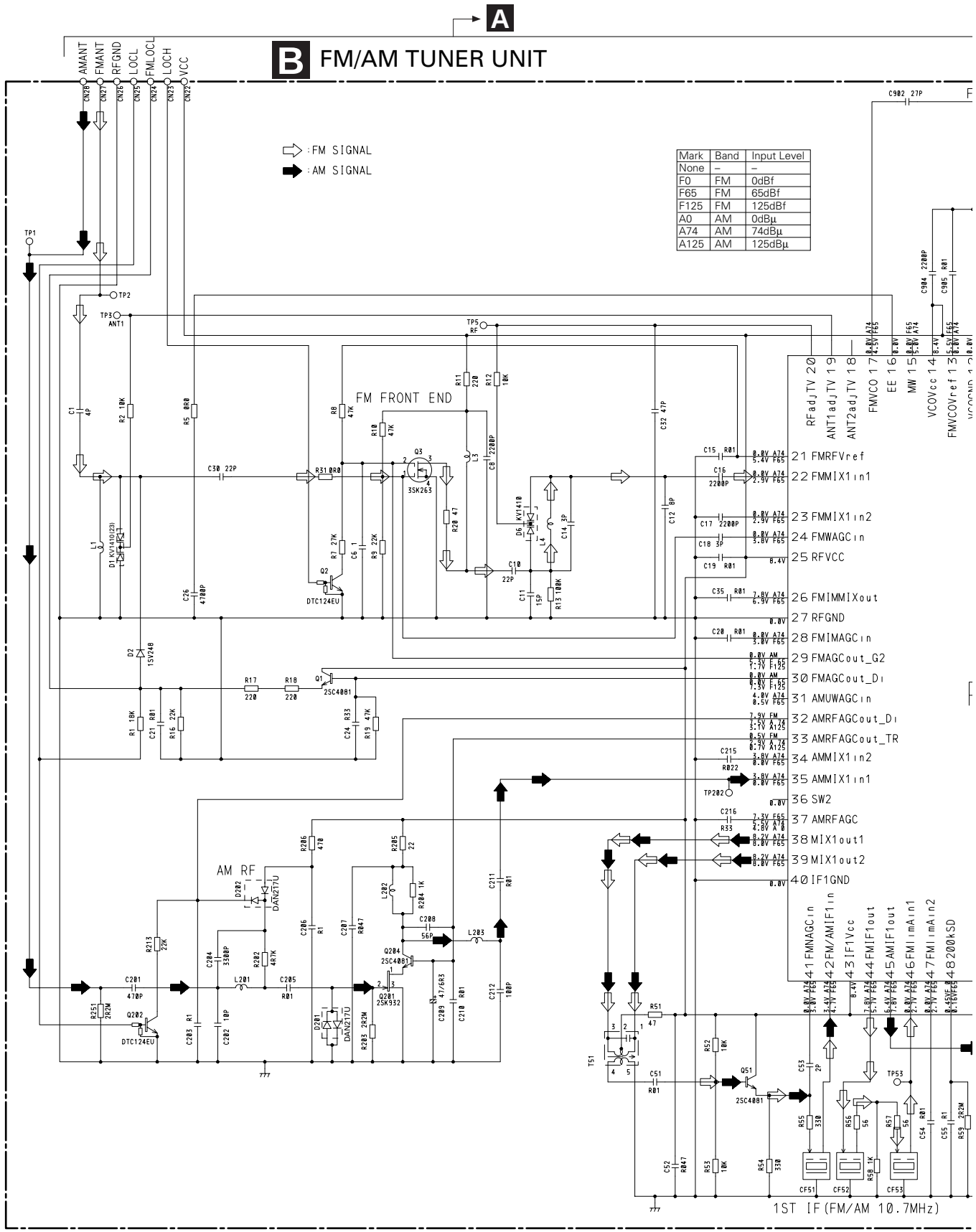
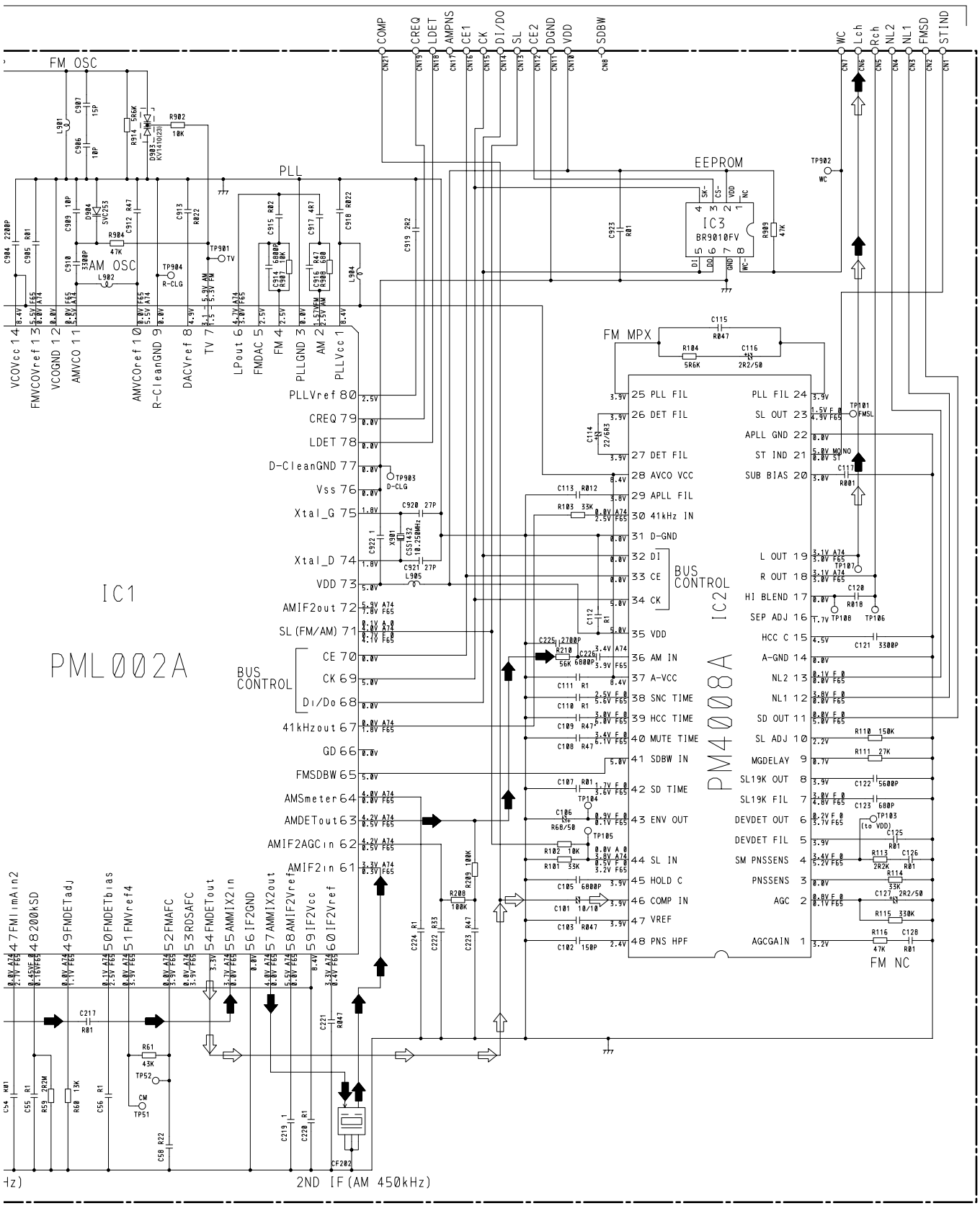
A-a A-b


SUB.W
REAR RCA
SUB.W
FRONT RCA
CN431
CN433
DEH-P77DH/X1M/UC
DEH-P47DH/X1M/UC
FM(100%):3.84dBs
AM(30%):-6.36dBs
IP-BUS:9.54dBs
S-CD:9.74dBs
FM(100%):30.6dBs
AM(30%):20.1dBs
IP-BUS:36.3dBs
S-CD:36.6dBs
FL+
FL-
FR+
FR-
RL+
POWER AMP
PAL005A
IC551
MUTE
FM(100%):4.6dBs
AM(30%):-5.9dBs
IP-BUS:10.3dBs
S-CD:10.5dBs
HIGHTOUT
IC452 PA2028A
IC451 PML004AF
SELECTOR/
IC VOLUME
DFS ALARM
RESET
IC631
S-80734AN
SYS+B
VDD
B.UP
5.2V
5.3V


CN951
FR-
RL+
RL-
RR+
RR-
BACK UP
GND
ACC
B. REM
MUTE
ILL
YELLOW
BLOCK
RED
BLUE/WHITE
YELLOW/BLACK
ORANGE/WHITE
CEK1136
10A
ALARM (BROWN)
DOOR SW
SENSOR
DRLOCK
STARTER
WHITE/YELLOW
WHITE/RED
WHITE/ORANGE
BLUE/BROWN
CN952
DEH-P77DH/X1M/UC
TELEPHONE MUTE
IC851
TPD1018F
DFS ALARM
IC852
TPD1018F
VDD REGULATOR
BV REGULATOR
BACKUP SENSE
ACC SENSE
MUTE
IC551 PAL00
BEEP
VDD POWER SUPPLY
BACK LIGHT POWER SUPPLY
.UMINATION
iWER SUPPLY
DEH-P77DH/X1M/UC

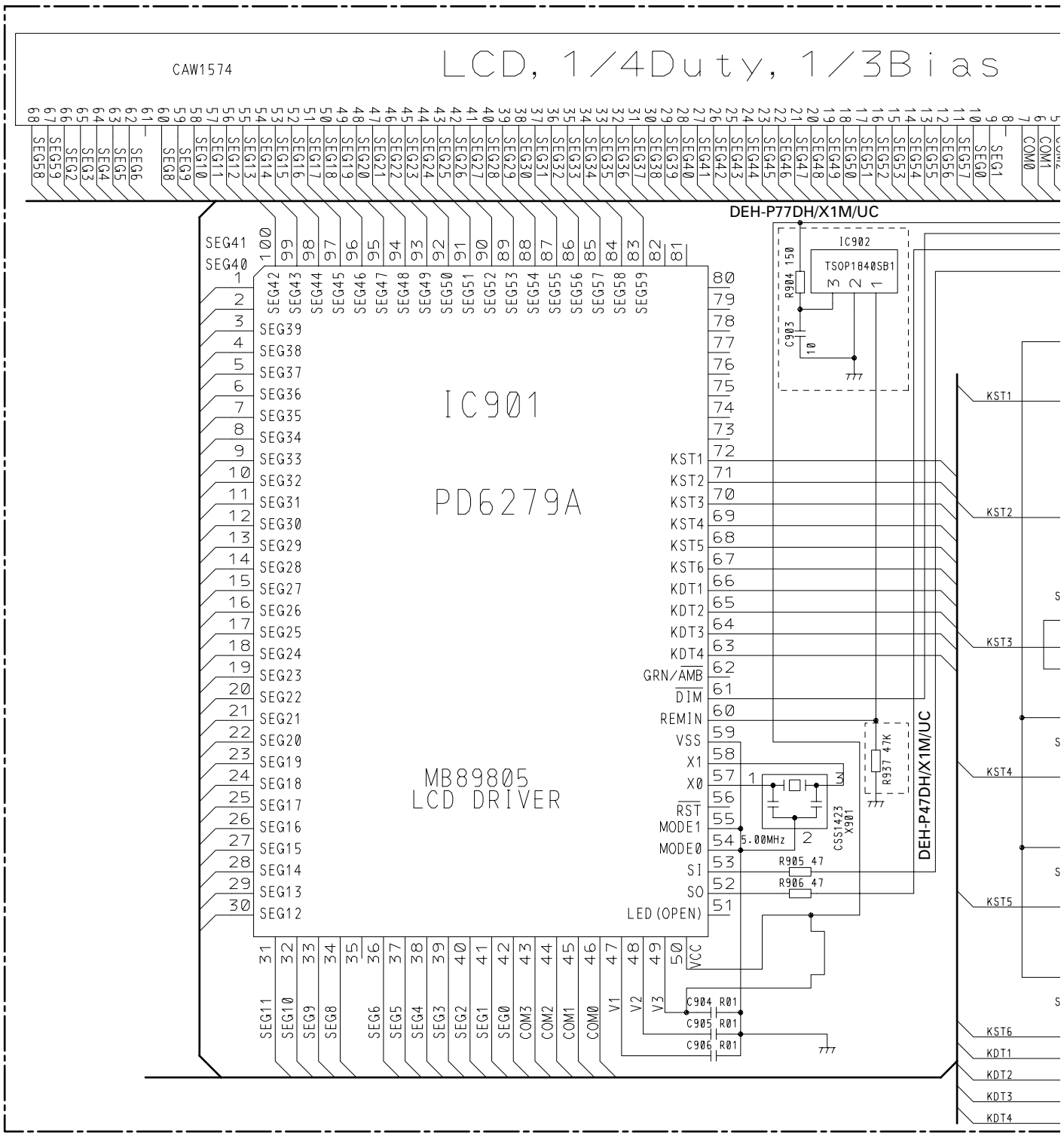
3.3 FM/AM TUNER UNIT

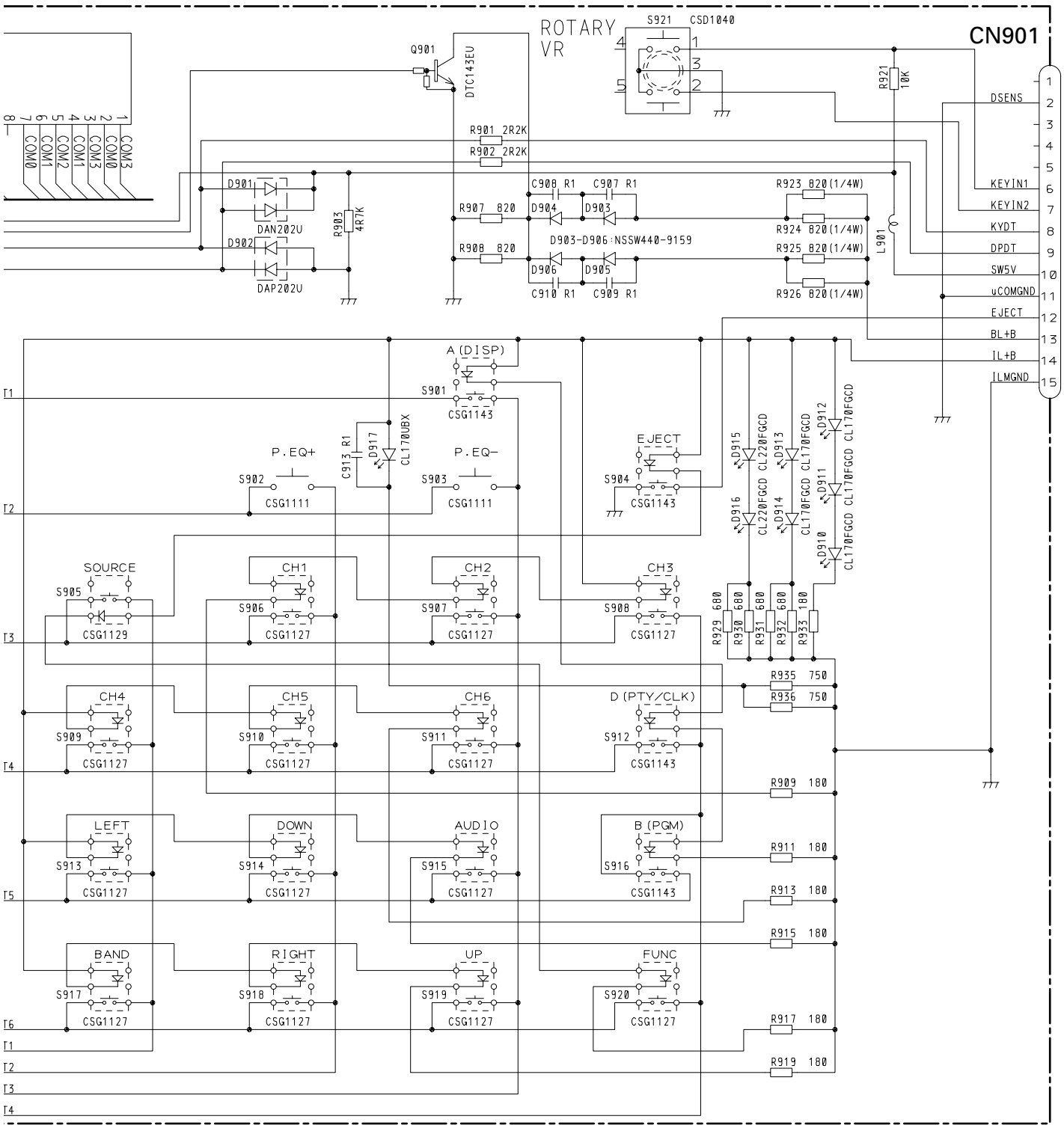



IC1
PML002A
PM4108A IC2
IC3
BR9010FV
EEPROM
FM OSC
PLL
AM OSC
FM MPX
BUS CONTROL
FM NC
2ND IF(AM 450kHz)

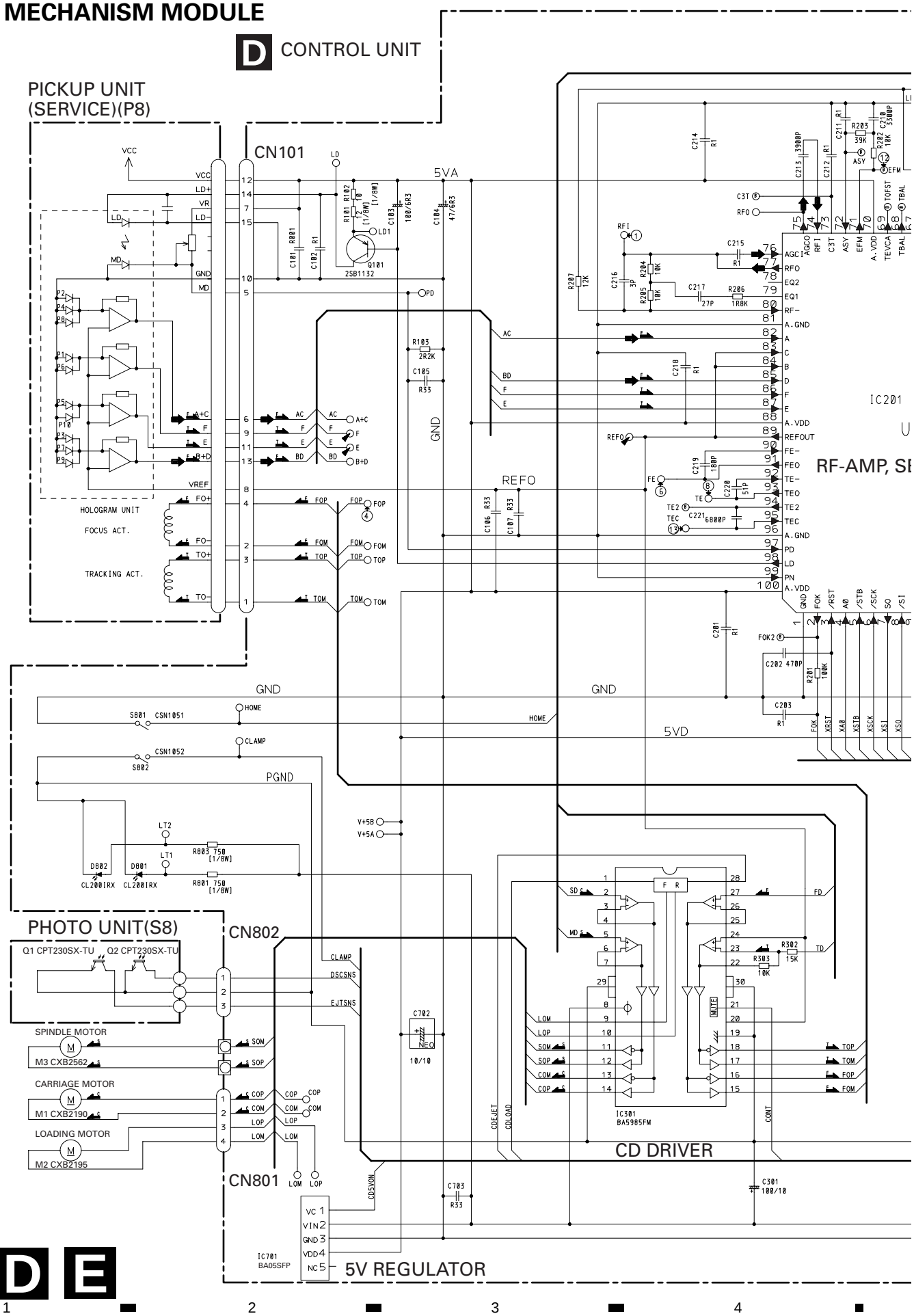
3.4 KEYBOARD UNIT

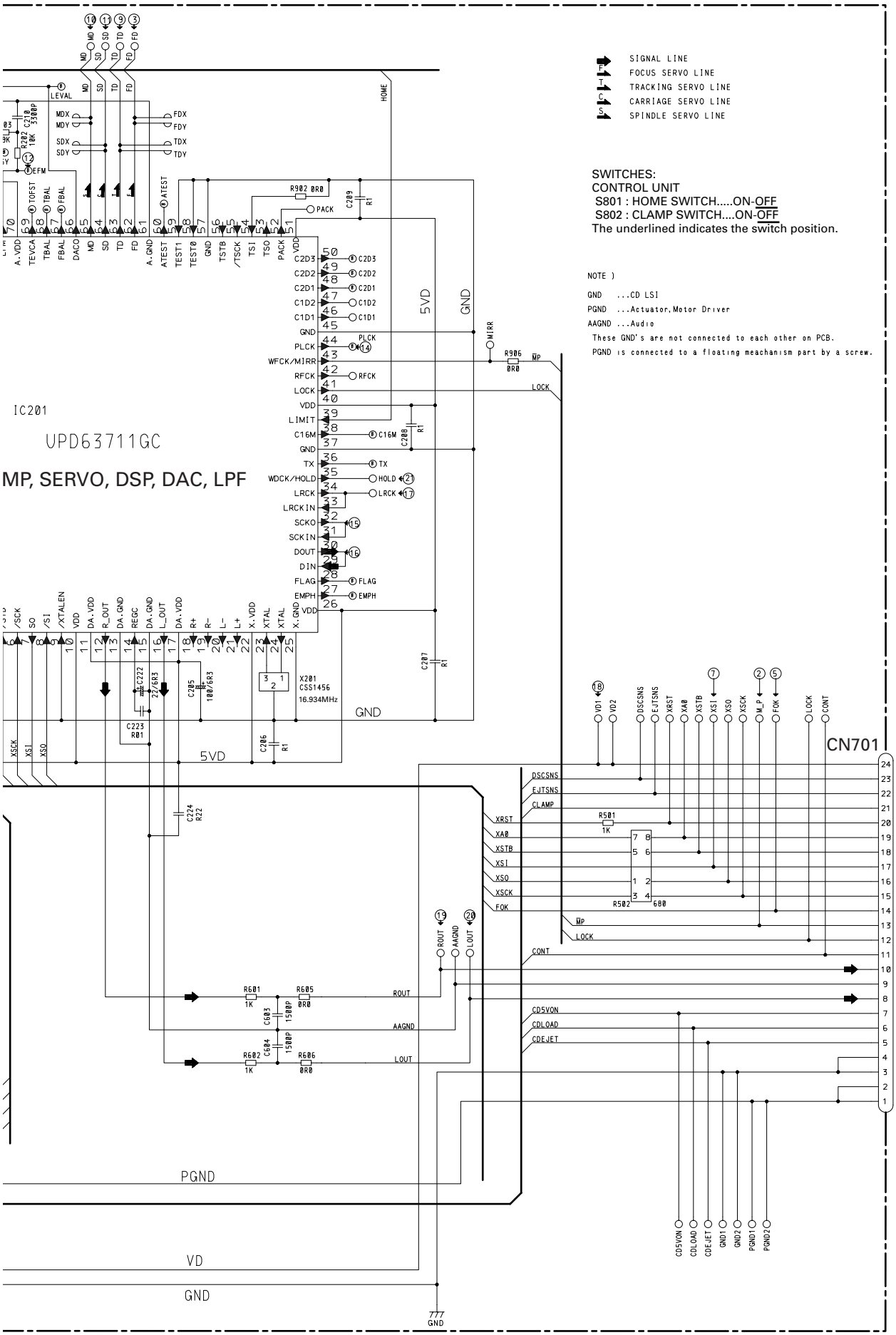
C KEYBOARD UNIT




CN901
ROTARY VR
S921 CSD1040
Q901
DTC143EU
R921 10K
DSENS
KEYIN1
KEYIN2
KYDT
DPDT
SW5V
uCOMGND
EJECT
BL+B
IL+B
ILMGND
CN651
R901 2R2K
R902 2R2K
D901
D902
DAN202U
DAP202U
R903 4R7K
C908 R1
C907 R1
R907 820
D904
D903
R908 820
D906
D905
C910 R1
C909 R1
D903-D906:NSSW440-9159
R923 820(1/4W)
R924 820(1/4W)
R925 820(1/4W)
R926 820(1/4W)
L901
A(DISP)
S901 CSG1143
P.EQ+
S902 CSG1111
P.EQ-
S903 CSG1111
C913 R1
D917
CL170UBX
EJECT
S904 CSG1143
D915
D913
D912
D916
D914
D911
D910
CL220FGCD
CL170FGCD
CL170FGCD CL170FGCD CL170FGCD
R929 680
R930 680
R931 680
R932 680
R933 180
SOURCE
S905 CSG1129
CH1
S906 CSG1127
CH2
S907 CSG1127
CH3
S908 CSG1127
R935 750
R936 750
CH4
S909 CSG1127
CH5
S910 CSG1127
CH6
S911 CSG1127
D (PTY/CLK)
S912 CSG1143
R909 180
LEFT
S913 CSG1127
DOWN
S914 CSG1127
AUDIO
S915 CSG1127
B (PGM)
S916 CSG1143
R911 180
R913 180
R915 180
BAND
S917 CSG1127
RIGHT
S918 CSG1127
UP
S919 CSG1127
FUNC
S920 CSG1127
R917 180
R919 180
T1
T2
T3
T4
T5
T6
COM3
COM0
COM2
COM1
COM3
COM2
COM1
COM0

3.5 CD MECHANISM MODULE

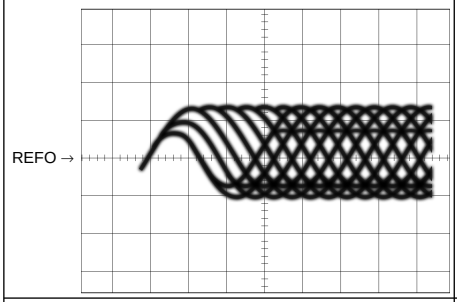



SIGNAL LINE
FOCUS SERVO LINE
TRACKING SERVO LINE
CARRIAGE SERVO LINE
SPINDLE SERVO LINE
SWITCHES:
CONTROL UNIT
S801 : HOME SWITCH.....ON-OFF
S802 : CLAMP SWITCH....ON-OFF
The underlined indicates the switch position.
NOTE)
GND ...CD LSI
PGND ...Actuator, Motor Driver
AAGND ...Audio
These GND's are not connected to each other on PCB.
PGND is connected to a floating meachanism part by a screw.
IC201
UPD63711GC
MP, SERVO, DSP, DAC, LPF
X201
CSS1456
16.934MHz
5VD
GND
CN701
CN681
PGND
VD
GND

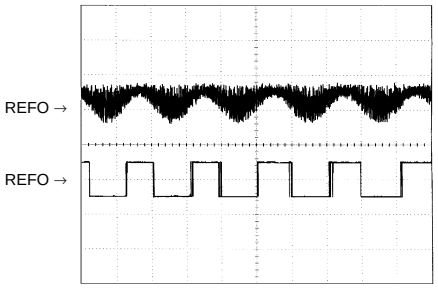
Note:1. The encircled numbers denote measuring pointes in the circuit diagram.
2. Reference voltage
REFO:2.5V

● Waveforms

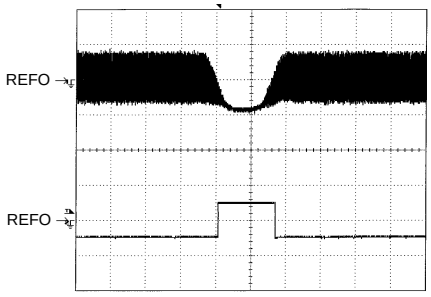
① RFI 0.5V/div. 0.5µs/div.
Normal mode: play



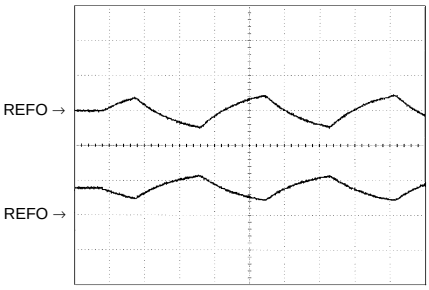
① CH1: RFI 1V/div. 0.5ms/div.
② CH2: MIRR 5V/div.
Test mode: Tracking open



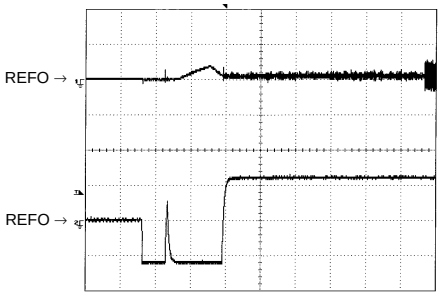
① CH1: RFI 1V/div. 0.5ms/div.
② CH2: MIRR 5V/div.
Normal mode: The defect part passes 800µm



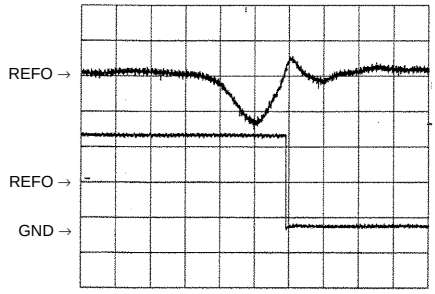
③ CH1: FD 0.5V/div. 0.2s/div.
④ CH2: FO+ 2V/div.
Test mode: No disc, Focus close



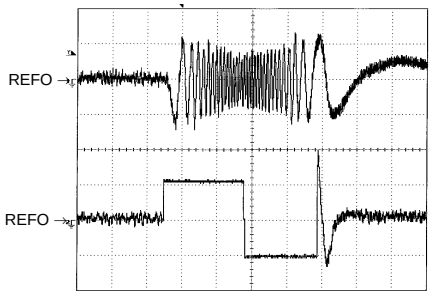
③ CH1: FD 0.5V/div. 0.2s/div.
⑤ CH2: FOK 2V/div.
Normal mode: Focus close



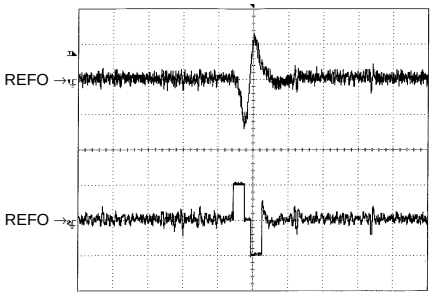
⑥ CH1: FE 0.5V/div. 1ms/div.
⑦ CH2: XSI 2V/div.
Normal mode: Focus close



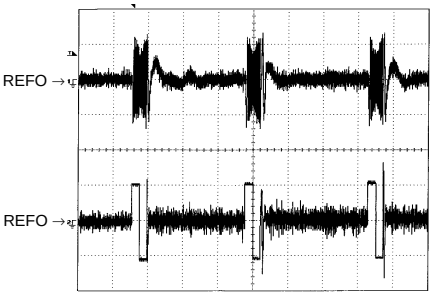
⑧ CH1: TE 0.5V/div. 0.5ms/div.
⑨ CH2: TD 0.5V/div.
Test mode: 32 tracks jump (FWD)



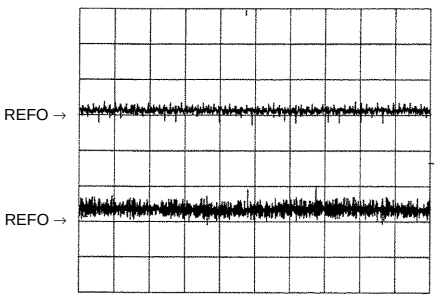
⑧ CH1: TE 0.5V/div. 0.5ms/div.
⑨ CH2: TD 0.5V/div.
Test mode: Single jump (FWD)



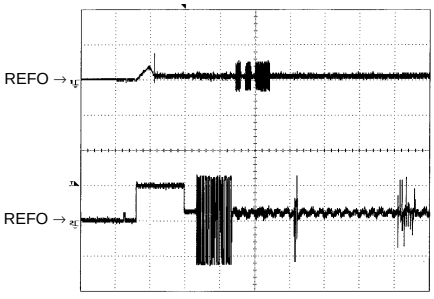
⑧ CH1: TE 0.5V/div. 5ms/div.
⑨ CH2: TD 0.5V/div.
Test mode: 100 tracks jump (FWD)



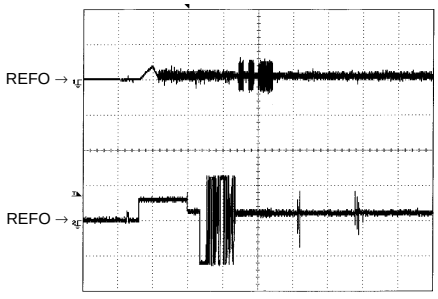
⑥ CH1: FE 0.1V/div. 20ms/div.
③ CH2: FD 0.2V/div.
Normal mode: Play



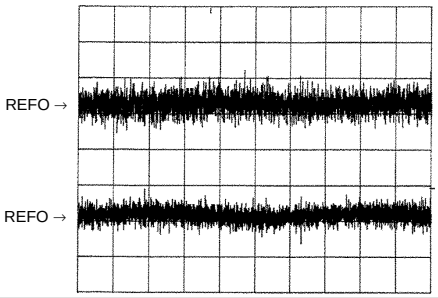
③ CH1: FD 0.5V/div. 0.5s/div.
⑩ CH2: MD 1V/div.
Normal mode: Focus close (12cm)



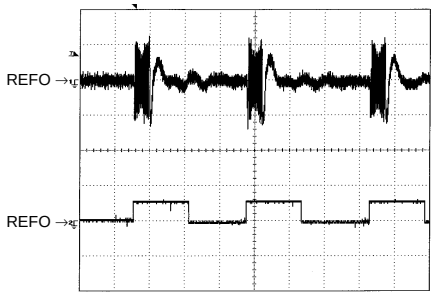
③ CH1: FD 0.5V/div. 0.5s/div.
⑩ CH2: MD 1V/div.
Normal mode: Focus close (8cm)



⑧ CH1: TE 0.2V/div. 20ms/div.
⑨ CH2: TD 0.2V/div.
Normal mode: play

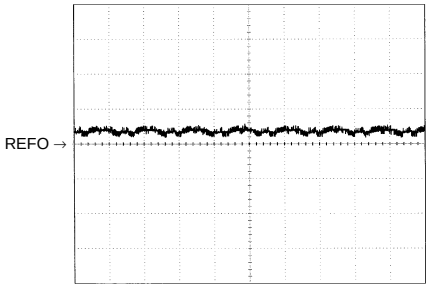


⑧ CH1: TE 0.5V/div. 5ms/div.
⑪ CH2: SD 0.5V/div.
TEST mode: 100 Tracks jump(FWD)

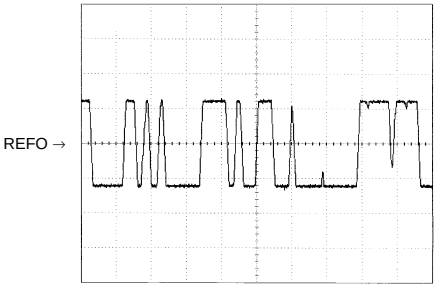


⑩ MD 0.5V/div. 0.1s/div.

Normal mode: Play (12cm)

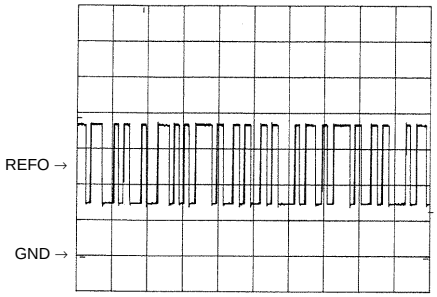


⑩ MD 1V/div. 10ms/div.
Normal mode:
Long Search (12cm)

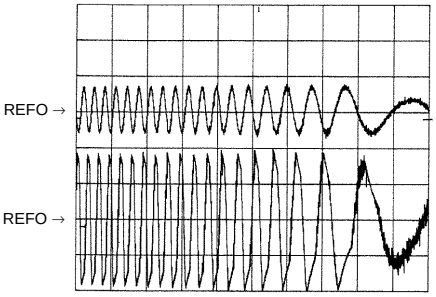


⑫ EFM 1V/div. 5µs/div.

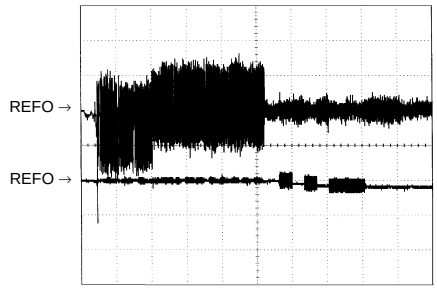
Normal mode: play



⑧ CH1: TE 1V/div. 2ms/div.
⑬ CH2: TEC 1V/div.
Test mode: Focus close
Tracking open

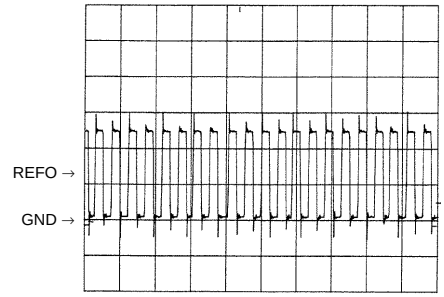


⑧ CH1: TE 0.5V/div. 0.2s/div.
⑥ CH2: FE 0.5V/div.
Normal mode: AGC after focus close



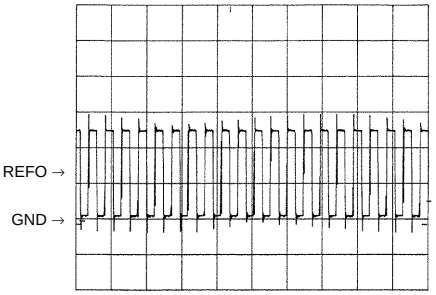
⑭ PLCK 2V/div. 0.5µs/div.

Normal mode: play



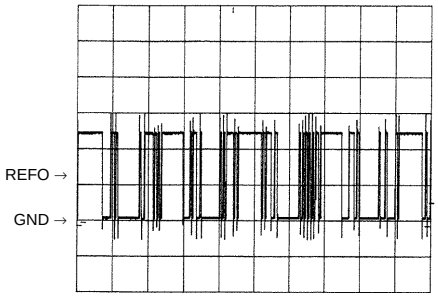
⑮ SCKO 2V/div. 1µs/div.

Normal mode: play



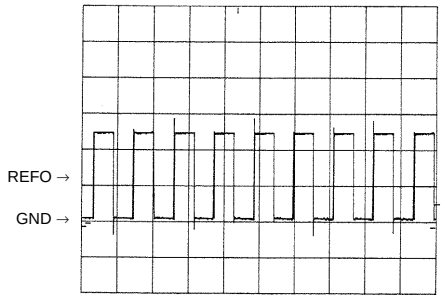
⑯ Dout 2V/div. 10µs/div.

Normal mode: play



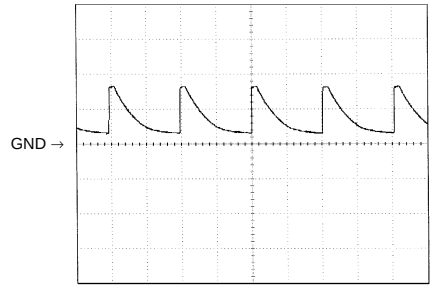
⑰ LRCK 2V/div. 20µs/div.

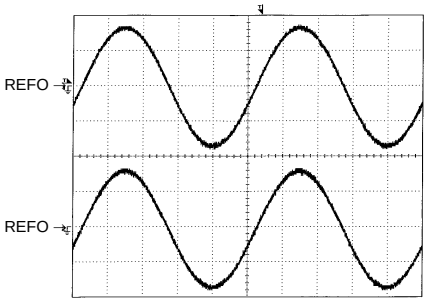
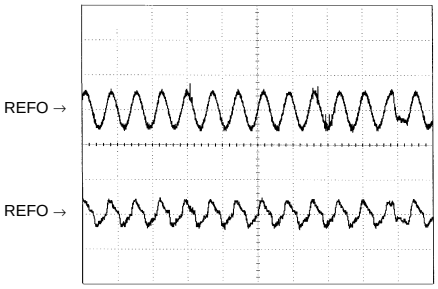
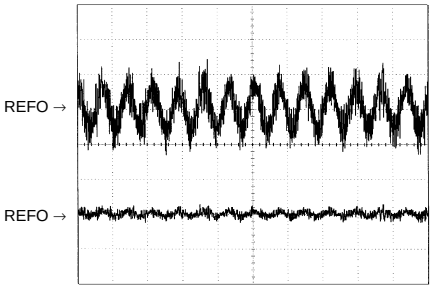
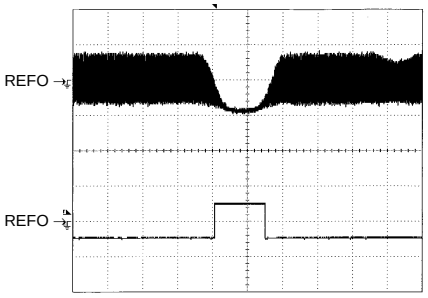
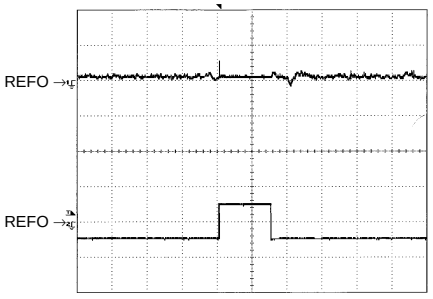
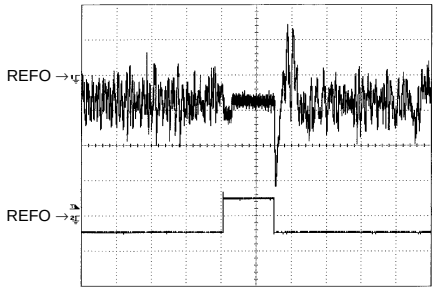
Normal mode: play



⑱ VD 5V/div. 50ms/div.

Normal mode: No disc



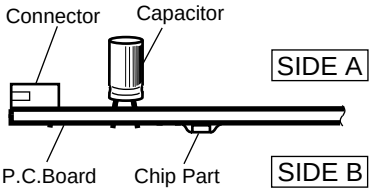
⑲ CH1: R OUT 1V/div. ⑳ CH2: L OUT 1V/div. 0.2ms/div. Normal mode: Play (1kHz 0dB) 	⑥ CH1: FE 0.2V/div. ③ CH2: FD 0.5V/div. 1ms/div. Normal mode: During AGC 	⑧ CH1: TE 0.2V/div. ⑨ CH2: TD 0.5V/div. 1ms/div. Normal mode: During AGC 
① CH1: RFI 1V/div. ㉑ CH2: HOLD 5V/div. 0.5ms/div. Normal mode: The defect part passes 800µm(B.D) 	③ CH1: FD 0.5V/div. ㉑ CH2: HOLD 5V/div. 0.5ms/div. Normal mode: The defect part passes 800µm(B.D) 	⑨ CH1: TD 0.1V/div. ㉑ CH2: HOLD 5V/div. 0.5ms/div. Normal mode: The defect part passes 800µm(B.D) 

4. PCB CONNECTION DIAGRAM

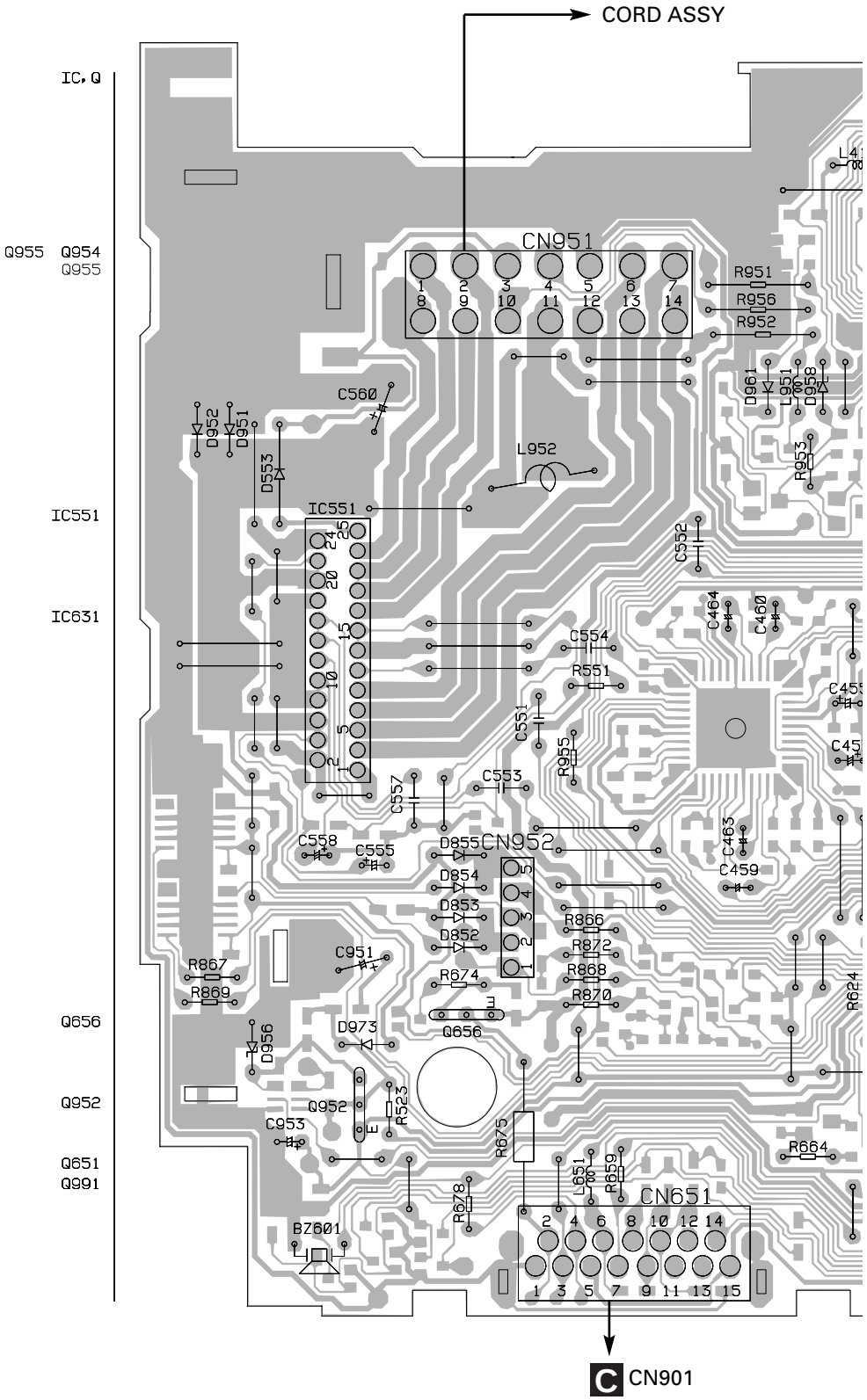
4.1 TUNER AMP UNIT

NOTE FOR PCB DIAGRAMS

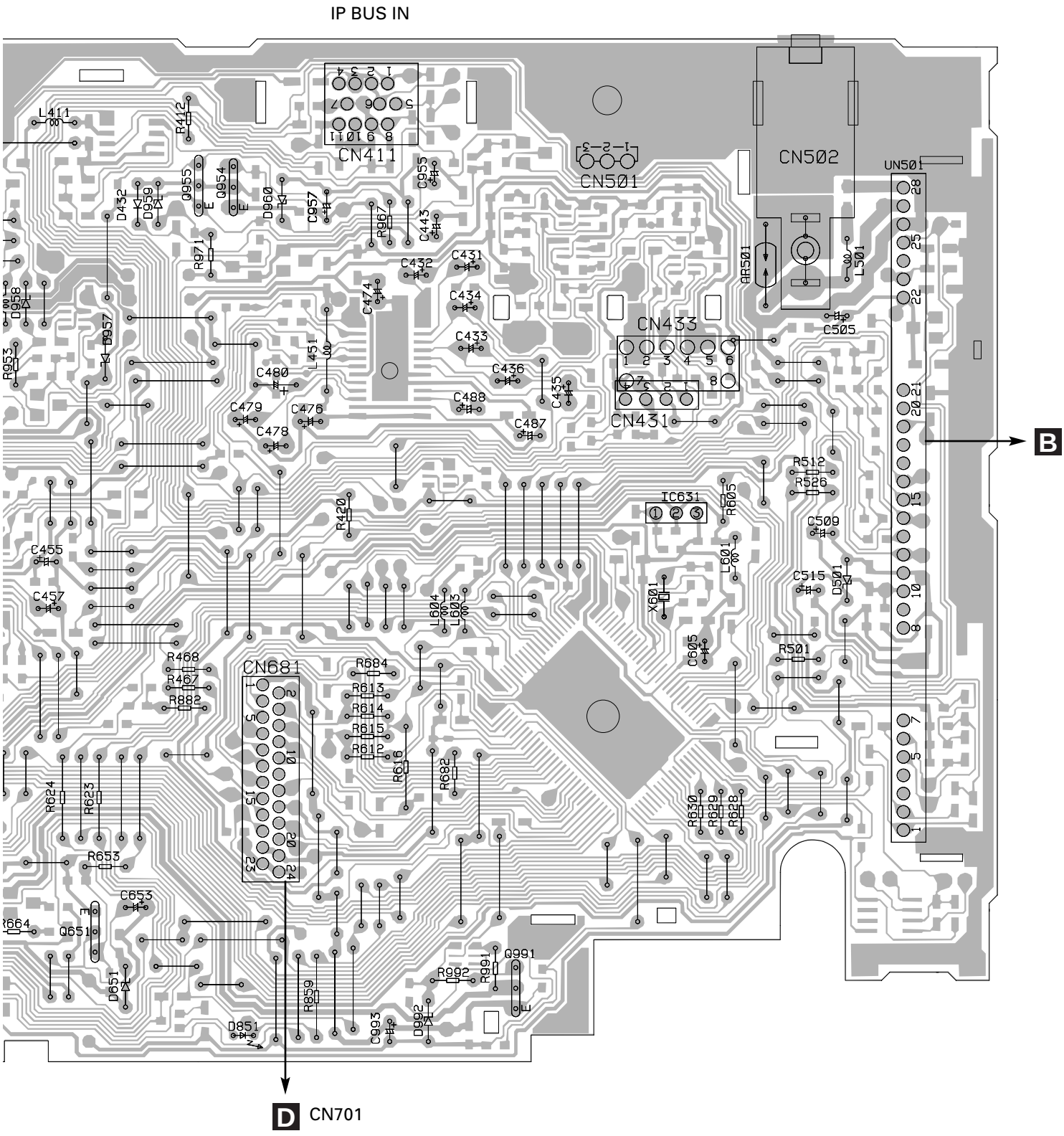
1. The parts mounted on this PCB include all necessary parts for several destination.
   For further information for respective destinations, be sure to check with the schematic diagram.
2. Viewpoint of PCB diagrams



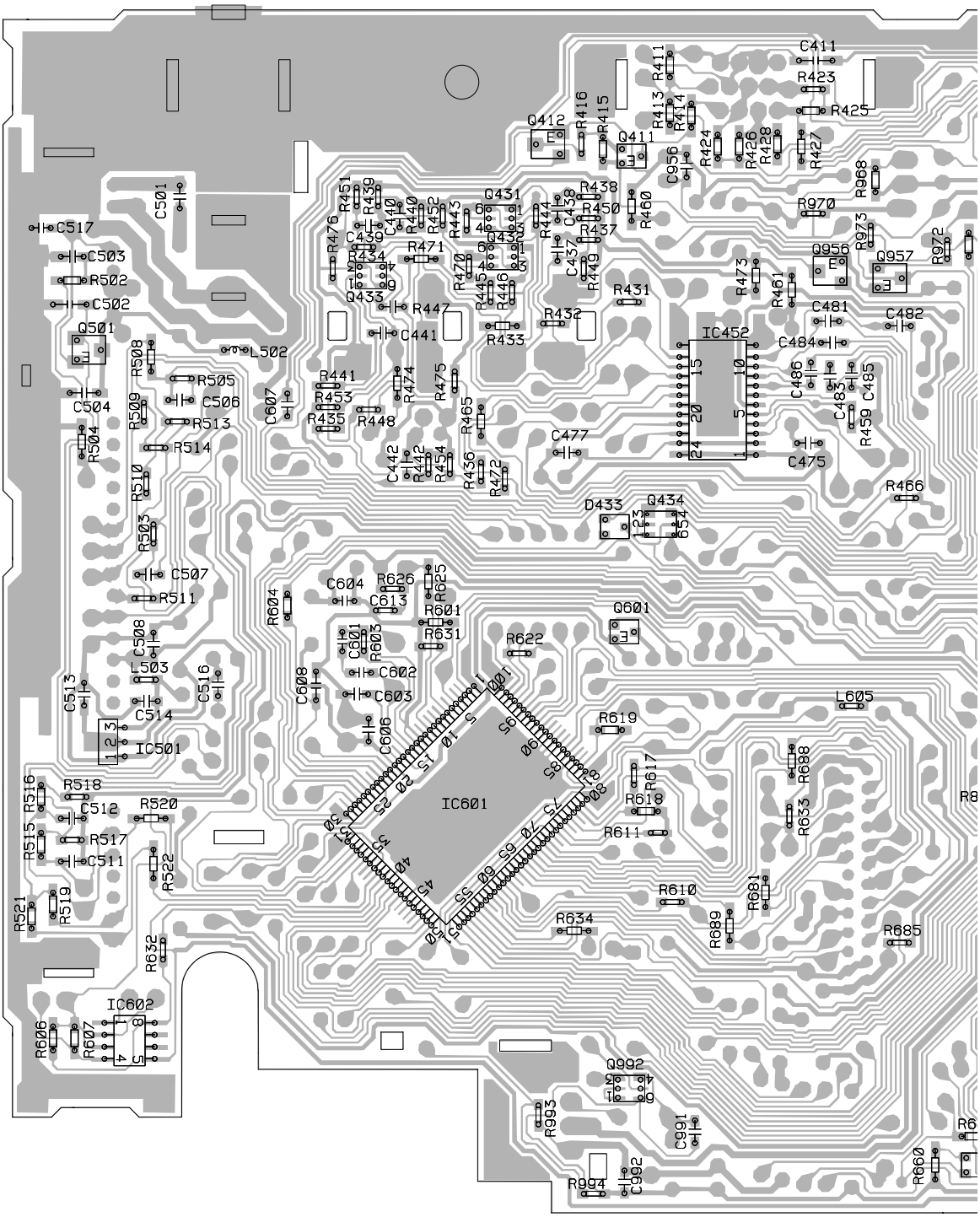
A TUNER AMP UNIT



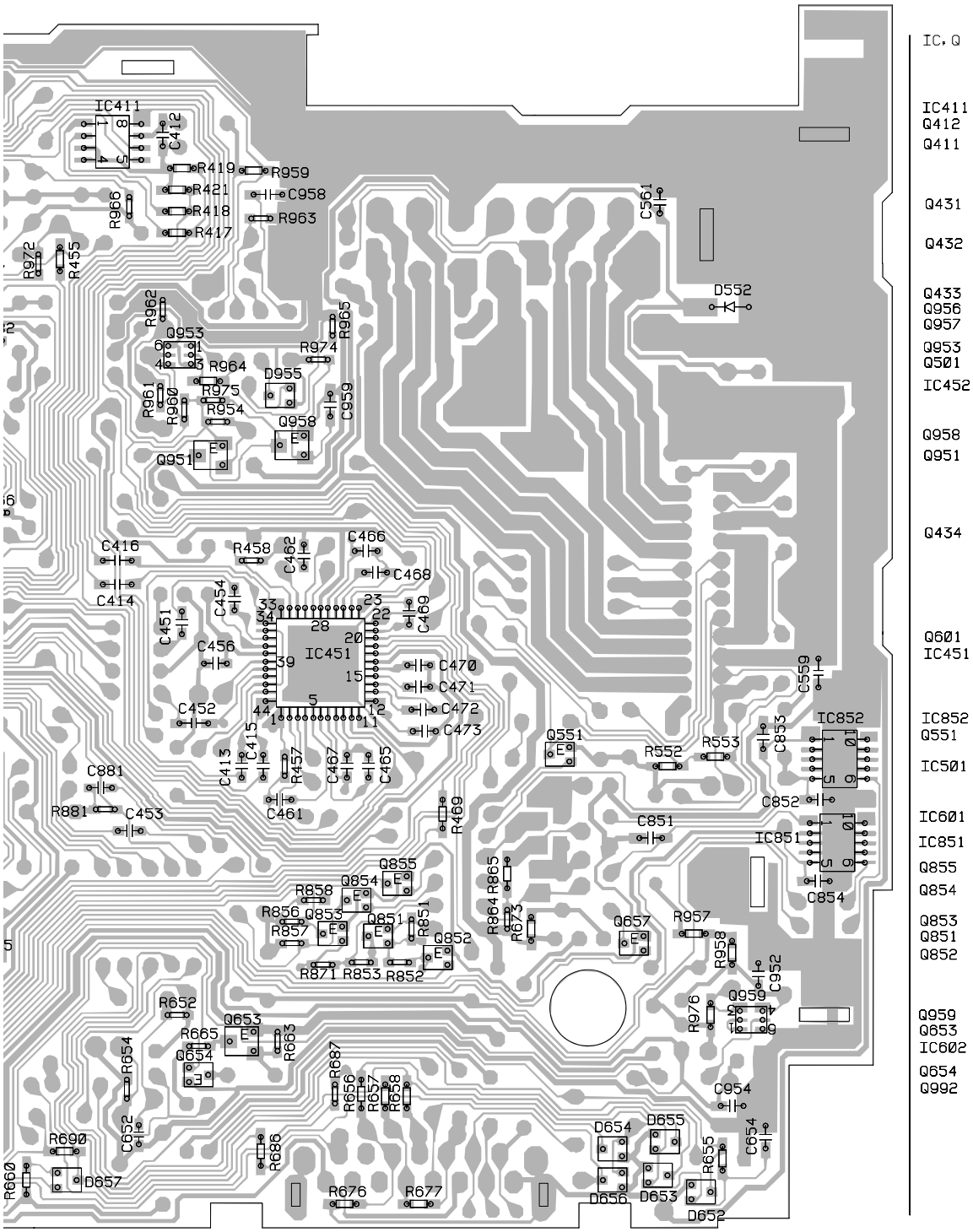
SIDE A


IP BUS IN
CN411
CN501
CN502
UN501
CN433
CN431
CN681
IC631
B
D
CN701

A TUNER AMP UNIT

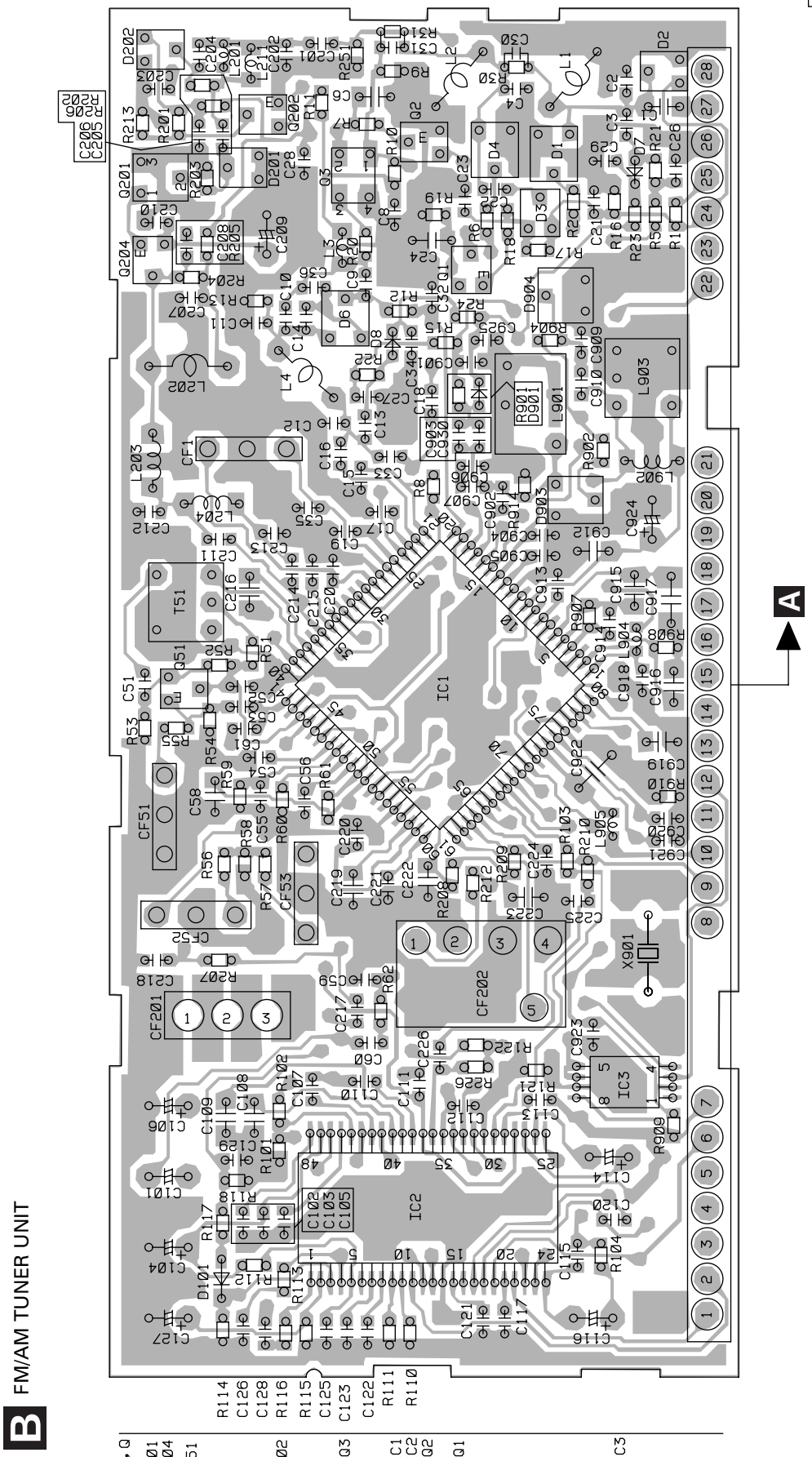


SIDE B

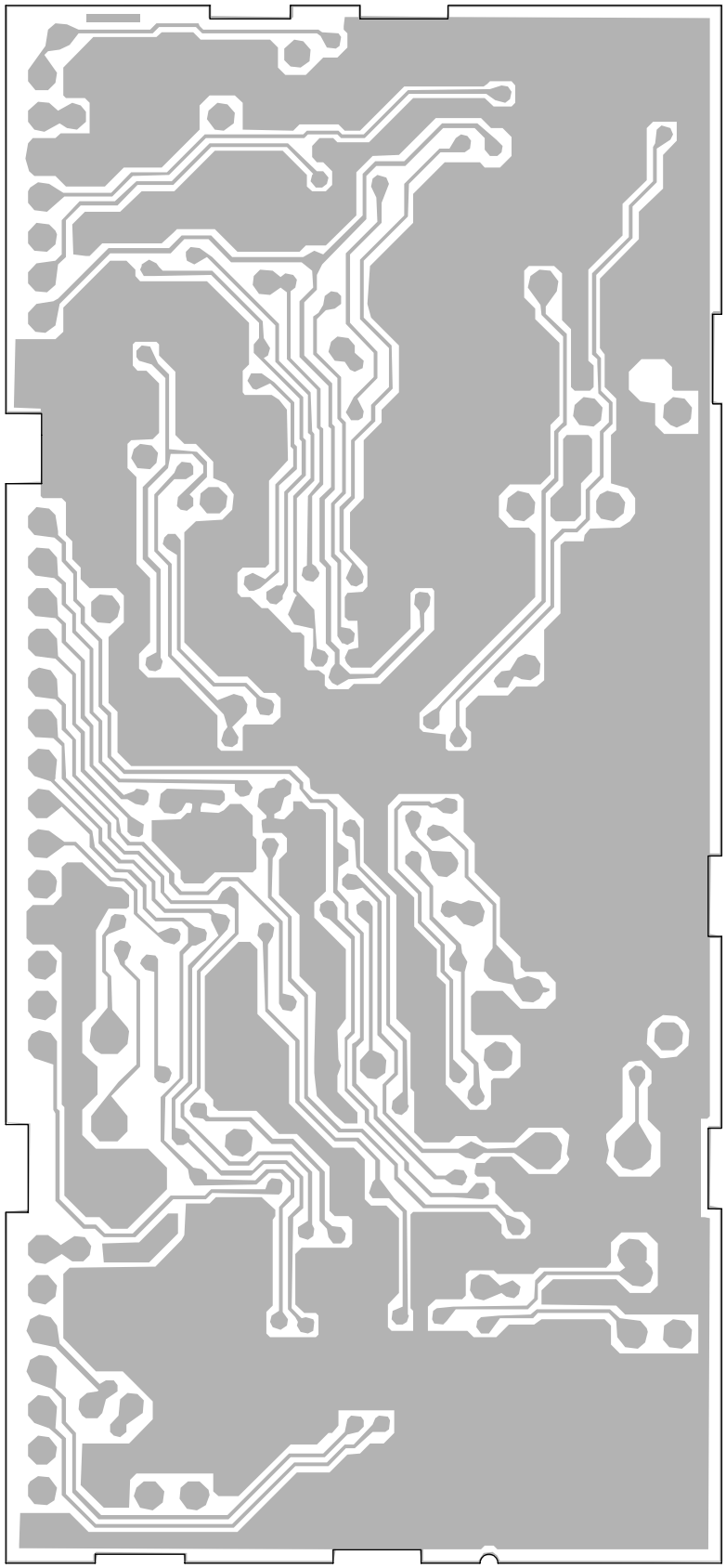

IC411
C412
R419
R421
R418
R417
R959
C958
R963
R966
R972
R455
R962
R965
Q953
R974
R964
D955
R975
R961
R960
R954
C959
Q958
Q951
C561
D552
C416
C414
R458
C462
C466
C468
C454
C451
C456
C469
IC451
C470
C471
C472
C473
C452
C415
C413
R457
C467
C465
C461
C881
R881
C453
R469
Q551
R552
R553
C853
IC852
C852
C851
IC851
C854
Q855
Q854
R858
R856
Q853
R857
Q851
R851
Q852
R871
R853
R852
R865
R864
R673
Q657
R957
R958
C952
Q959
R976
C954
R652
Q653
R665
R663
Q654
R654
R687
R656
R657
R658
C652
R690
R686
R660
D657
R676
R677
D654
D655
D656
D653
R655
C654
D652
IC, Q
IC411
Q412
Q411
Q431
Q432
Q433
Q956
Q957
Q953
Q501
IC452
Q958
Q951
Q434
Q601
IC451
IC852
Q551
IC501
IC601
IC851
Q855
Q854
Q853
Q851
Q852
Q959
Q653
IC602
Q654
Q992

4.2 FM/AM TUNER UNIT

SIDE A



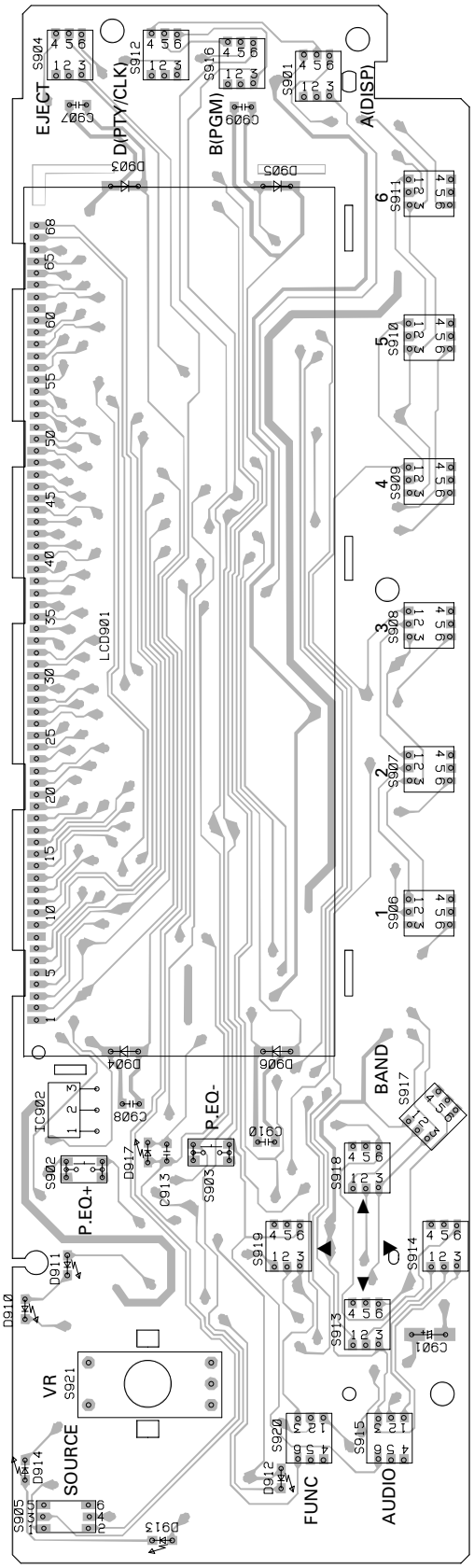
SIDE B



B FM/AM TUNER UNIT

4.3 KEYBOARD UNIT

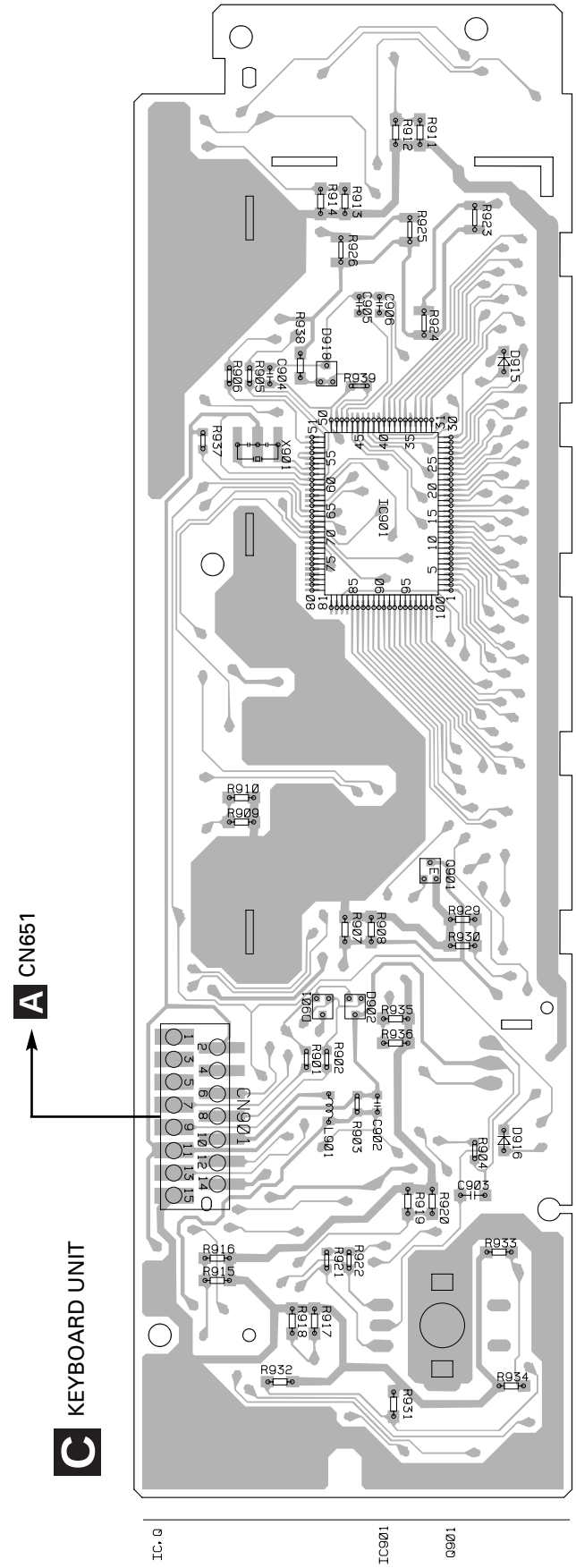
SIDE A



C KEYBOARD UNIT

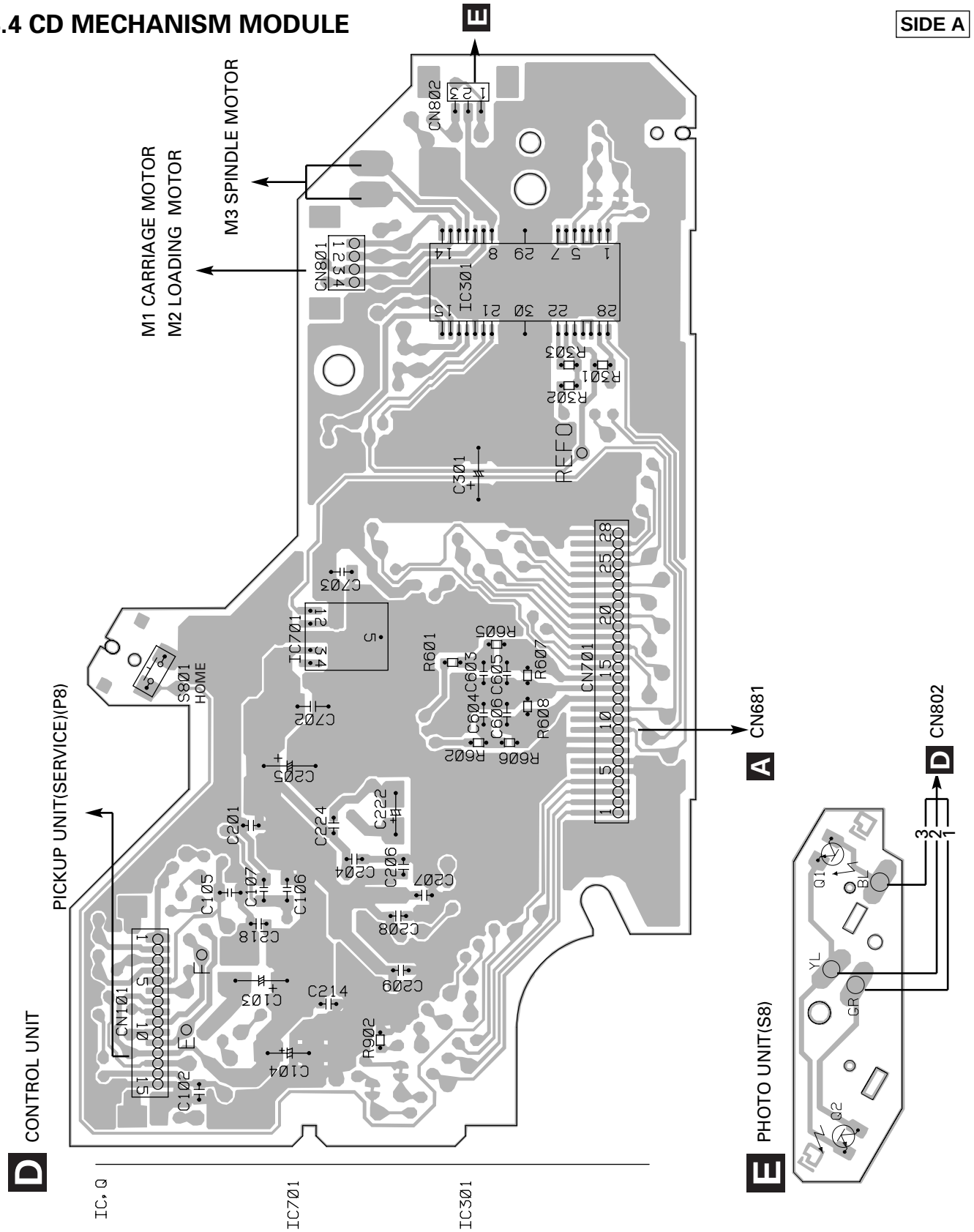
IC, Q
IC902

SIDE B

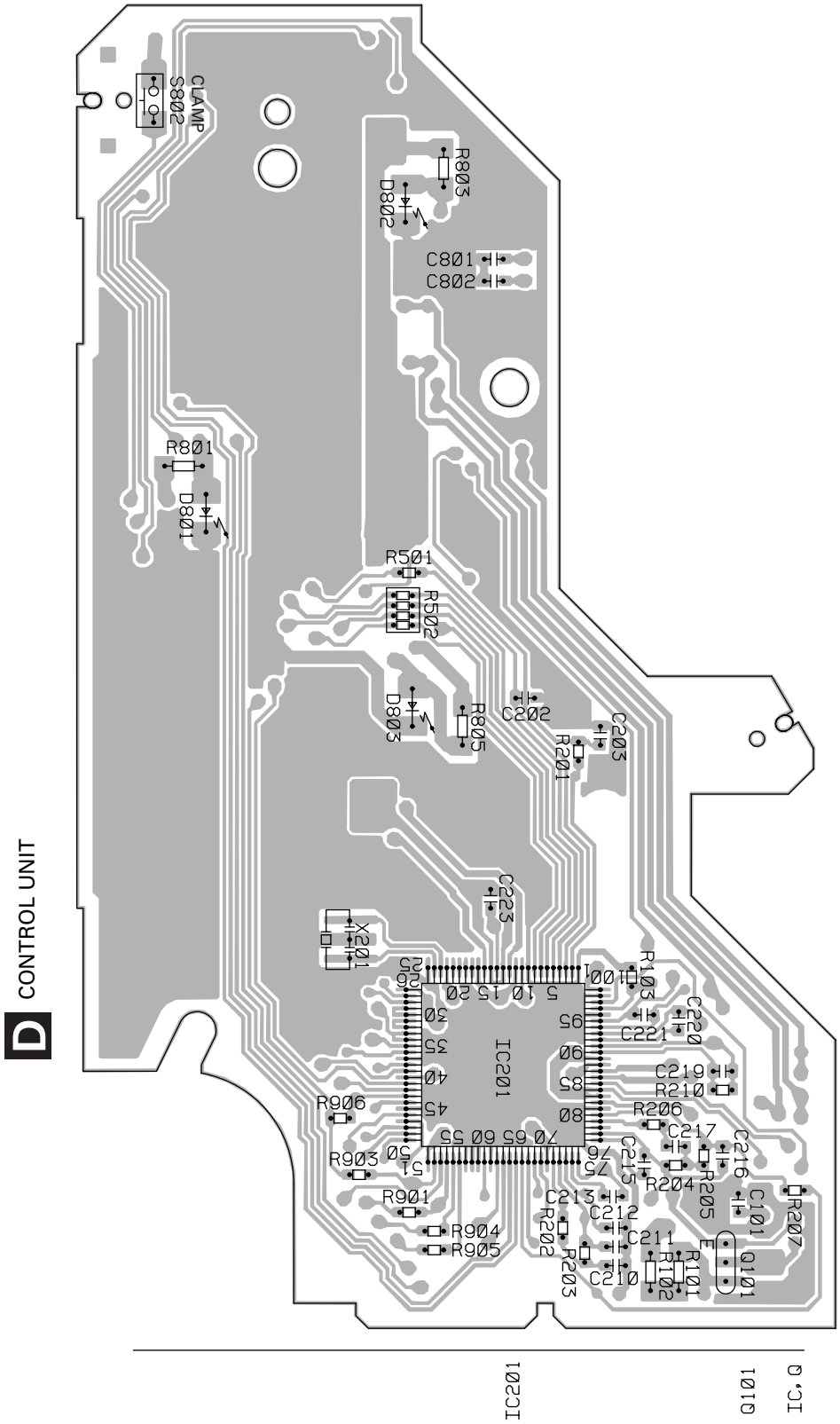

A CN651
C KEYBOARD UNIT
CN901
IC901
IC. G
C900
R911
R912
R913
R914
R923
R925
R926
R924
R938
D910
C904
R905
R906
R939
D915
X901
R937
R910
R909
C901
R908
R907
R929
R930
D902
R935
R936
R902
R901
C902
R903
D916
R904
C903
R919
R920
R933
R916
R915
R922
R921
R918
R917
R932
R934
R931

4.4 CD MECHANISM MODULE

SIDE A



SIDE B



D CONTROL UNIT

5. ELECTRICAL PARTS LIST

NOTES:

- Parts whose parts numbers are omitted are subject to being not supplied.
- The part numbers shown below indicate chip components.

Chip Resistor

RS1/○S○○○J,RS1/○○S○○○J

Chip Capacitor (except for CQS.....)

CKS....., CCS....., CSZS.....

A Unit Number : CWM6894(DEH-P77DH/X1M/UC)
Unit Name : Tuner Amp Unit

MISCELLANEOUS

=====Circuit Symbol and No.		===Part Name	Part No.
IC	411	IC	HA12187FP
IC	451	IC	PML004AF
IC	452	IC	PA2028A
IC	501	IC	S-81250SGUP
IC	551	IC	PAL005A
IC	601	IC	PE5106B
IC	631	IC	S-80734AN
IC	851	IC	TPD1018F
IC	852	IC	TPD1018F
Q	411	Transistor	2SA1586
Q	412	Transistor	DTC124EK
Q	431	Transistor	HN1C03F
Q	432	Transistor	HN1C03F
Q	433	Transistor	HN1C03F
Q	434	Transistor	IMD2A
Q	501	Transistor	2SC2412K
Q	551	Transistor	DTC144EU
Q	601	Transistor	DTA114EU
Q	651	Transistor	2SA933S
Q	653	Transistor	2SA1037K
Q	654	Transistor	DTC114EU
Q	656	Transistor	2SB1243
Q	657	Transistor	DTC114EU
Q	851	Transistor	2SA1576
Q	852	Transistor	DTC124EU
Q	853	Transistor	DTC143EU
Q	854	Transistor	DTC143EU
Q	855	Transistor	DTC143EU
Q	951	Transistor	2SA1037K
Q	952	Transistor	2SC3673
Q	953	Transistor	IMX1
Q	954	Transistor	2SD2396
Q	955	Transistor	2SB1238
Q	956	Transistor	DTC114EK
Q	957	Chip Transistor	2SC2712
Q	958	Transistor	DTC114EK
Q	959	Transistor	IMD2A
Q	991	Transistor	2SD2396
Q	992	Transistor	IMD2A
D	432	Diode	1SS133
D	433	Diode	DAN202U
D	501	Diode	HZS16(1)
D	552	Diode	S1G-6904G2P
D	553	Diode	MPG06G-6415G3
D	651	Diode	MTZ5R6J(C)
D	652	Diode Network	DA204U
D	653	Diode Network	DA204U
D	654	Diode Network	DA204U
D	655	Diode Network	DA204U
D	656	Diode Network	DA204U
D	657	Diode Network	DA204U
D	851	LED	BR4361F
D	852	Diode	ERA15-02VH
D	853	Diode	ERA15-02VH
D	854	Diode	ERA15-02VH
D	855	Diode	ERA15-02VH
D	951	Diode	ERA15-02VH
D	952	Diode	ERA15-02VH
D	955	Diode	DAN202U
D	956	Diode	HZS6L(B2)
D	957	Diode	HZS7L(C2)
D	958	Diode	HZS6L(C3)
D	959	Diode	HZS9L(A2)
D	960	Diode	HZS9L(B3)
D	961	Diode	ERA15-02VH
D	973	Diode	1SR139-400
D	992	Diode	HZS9L(B1)
L	411	Inductor	LAU3R3J
L	451	Ferri-Inductor	LAU101K
L	501	Ferri-Inductor	LAU4R7K
L	502	Inductor	CTF1399
L	503	Inductor	CTF1399
L	601	Inductor	LAU100K
L	603	Ferri-Inductor	LAU2R2K
L	604	Ferri-Inductor	LAU2R2K
L	605	Inductor	CTF1399
L	651	Ferri-Inductor	LAU101K
L	951	Ferri-Inductor	LAU2R2K
L	952	Choke Coil 600µH	CTH1221
X	601	Radiator 12.5829MHz	CSS1495
BZ	601	Buzzer	CPV1050
AR	501	Arrester	DSP-201M-S00B
		FM/AM Tuner Unit	CWE1501

RESISTORS

R	411		RS1/10S620J
R	412		RD1/4PU101J
R	413		RS1/10S101J
R	414		RS1/10S222J
R	415		RS1/10S332J
R	416		RS1/10S682J
R	417		RS1/10S102J
R	418		RS1/10S102J
R	419		RS1/10S473J
R	420		RD1/4PU103J
R	421		RS1/10S473J
R	423		RS1/10S821J
R	424		RS1/10S821J
R	425		RS1/10S223J
R	426		RS1/10S223J
R	427		RS1/8S102J
R	428		RS1/10S102J
R	431		RS1/10S820J
R	432		RS1/10S820J
R	433		RS1/8S820J

=====Circuit Symbol and No.===Part Name			Part No.	=====Circuit Symbol and No.===Part Name			Part No.
R	434		RS1/10S820J	R	605		RD1/4PU473J
R	435		RS1/10S820J	R	606		RS1/10S473J
R	436		RS1/10S820J	R	610		RS1/10S222J
R	437		RS1/10S331J	R	612		RD1/4PU222J
R	438		RS1/10S331J	R	613		RD1/4PU222J
R	439		RS1/10S331J	R	614		RD1/4PU473J
R	440		RS1/10S331J	R	615		RD1/4PU473J
R	441		RS1/10S331J	R	616		RD1/4PU473J
R	442		RS1/10S331J	R	617		RS1/10S104J
R	443		RS1/10S103J	R	618		RS1/10S333J
R	444		RS1/10S103J	R	619		RS1/10S223J
R	445		RS1/10S103J	R	622		RS1/10S0R0J
R	446		RS1/10S103J	R	623		RD1/4PU102J
R	447		RS1/10S103J	R	624		RD1/4PU102J
R	448		RS1/10S103J	R	625		RS1/8S102J
R	449		RS1/10S223J	R	626		RS1/10S822J
R	450		RS1/10S223J	R	628		RD1/4PU102J
R	451		RS1/10S223J	R	629		RD1/4PU102J
R	452		RS1/10S223J	R	630		RD1/4PU102J
R	453		RS1/10S223J	R	631		RS1/10S473J
R	454		RS1/10S223J	R	632		RS1/10S0R0J
R	455		RS1/10S102J	R	633		RS1/10S0R0J
R	457		RS1/10S102J	R	634		RS1/8S0R0J
R	458		RS1/10S102J	R	652		RS1/10S222J
R	459		RS1/10S203J	R	653		RD1/4PU472J
R	460		RS1/8S0R0J	R	654		RS1/10S222J
R	461		RS1/8S0R0J	R	655		RS1/10S473J
R	467		RD1/4PU0R0J	R	656		RS1/8S222J
R	468		RD1/4PU0R0J	R	657		RS1/10S222J
R	469		RS1/8S0R0J	R	658		RS1/10S472J
R	470		RS1/10S0R0J	R	659		RD1/4PU472J
R	471		RS1/10S0R0J	R	660		RS1/8S0R0J
R	472		RS1/10S0R0J	R	663		RS1/10S473J
R	473		RS1/8S0R0J	R	664		RD1/4PU152J
R	474		RS1/8S0R0J	R	665		RS1/10S1R0J
R	475		RS1/10S0R0J	R	673		RS1/10S473J
R	476		RS1/10S0R0J	R	674		RD1/4PU272J
R	501		RD1/4PU222J	R	675		RS2PMF330J
R	502		RS1/10S222J	R	676		RS1/10S104J
R	503		RS1/10S393J	R	677		RS1/10S473J
R	504		RS1/8S473J	R	678		RD1/4PU472J
R	505		RS1/10S473J	R	681		RS1/8S681J
R	508		RS1/8S681J	R	682		RD1/4PU102J
R	509		RS1/10S681J	R	684		RD1/4PU102J
R	510		RS1/10S681J	R	685		RS1/10S0R0J
R	511		RS1/10S103J	R	686		RS1/8S0R0J
R	512		RD1/4PU681J	R	687		RS1/10S0R0J
R	513		RS1/10S472J	R	688		RS1/8S0R0J
R	514		RS1/10S473J	R	689		RS1/8S0R0J
R	515		RS1/10S272J	R	690		RS1/10S473J
R	516		RS1/10S272J	R	851		RS1/10S223J
R	517		RS1/10S162J	R	852		RS1/10S223J
R	518		RS1/10S162J	R	853		RS1/10S103J
R	519		RS1/10S473J	R	856		RS1/10S473J
R	520		RS1/8S681J	R	857		RS1/10S473J
R	521		RS1/10S473J	R	858		RS1/10S473J
R	522		RS1/8S681J	R	859		RD1/4PU471J
R	523		RD1/4PU151J	R	864		RS1/10S103J
R	526		RD1/4PU473J	R	865		RS1/8S102J
R	551		RD1/4PU103J	R	866		RD1/4PU223J
R	552		RS1/10S103J	R	867		RD1/4PU103J
R	553		RS1/10S331J	R	868		RD1/4PU102J
R	601		RS1/8S473J	R	869		RD1/4PU103J
R	603		RS1/10S102J	R	870		RD1/4PU102J
R	604		RS1/10S101J	R	871		RS1/10S223J

Circuit Symbol and No.	Part Name	Part No.
R 872		RD1/4PU223J
R 881		RS1/10S103J
R 882		RD1/4PU102J
R 951		RD1/4PU102J
R 952		RD1/4PU153J
R 953		RD1/4PU472J
R 954		RS1/10S472J
R 955		RD1/4PU102J
R 956		RD1/4PU102J
R 957		RS1/10S101J
R 958		RS1/10S622J
R 959		RS1/10S473J
R 960		RS1/10S473J
R 961		RS1/10S103J
R 962		RS1/10S473J
R 963		RS1/10S472J
R 964		RS1/10S103J
R 965		RS1/10S473J
R 966		RS1/10S473J
R 967		RD1/4PU102J
R 968		RS1/10S102J
R 970		RS1/10S1R0J
R 971		RD1/4PU473J
R 972		RS1/10S103J
R 973		RS1/10S473J
R 974		RS1/10S103J
R 975		RS1/10S473J
R 976		RS1/10S152J
R 991		RD1/4PU221J
R 992		RD1/4PU221J
R 993		RS1/10S472J
R 994		RS1/10S222J

CAPACITORS

Circuit Symbol and No.	Part Name	Part No.
C 411		CKSYB104K16
C 412		CKSQYB473K50
C 413		CKSQYB105K10
C 414		CKSYB105K16
C 415		CKSQYB105K10
C 416		CKSYB105K16
C 431		CEJA100M16
C 432		CEJA100M16
C 433		CEJA100M16
C 434		CEJA100M16
C 435		CEJA100M16
C 436		CEJA100M16
C 437		CKSQYB222K50
C 438		CKSQYB222K50
C 439		CKSQYB222K50
C 440		CKSQYB222K50
C 441		CKSQYB222K50
C 442		CKSQYB222K50
C 443		CEJA220M16
C 451		CKSQYB224K16
C 452		CKSYB224K16
C 453		CKSQYB474K16
C 454		CKSQYB474K16
C 455		CEJA470M10
C 456		CKSQYB104K50
C 457		CEJA100M16
C 459		CEJANP4R7M16
C 460		CEJANP4R7M16
C 461		CKSQYB152K50
C 462		CKSQYB152K50
C 463		CEJANP4R7M16
C 464		CEJANP4R7M16
C 465		CKSQYB473K50
C 466		CKSQYB473K50
C 467		CKSQYB473K50
C 468		CKSQYB473K50
C 469		CKSQYB153K50
C 470		CKSQYB333K50
C 471		CKSQYB123K50
C 472		CKSQYB473K50
C 473		CKSQYB153K50
C 474		CEJA100M16
C 475		CKSQYB471K50
C 476		CEJA100M16
C 477		CKSQYB104K50
C 478		CEJA100M16
C 479		CEJA100M16
C 480		CASA4R7M16
C 481		CKSQYB105K10
C 482		CKSQYB105K10
C 483		CKSQYB105K10
C 484		CKSQYB105K10
C 485		CKSQYB105K10
C 486		CKSQYB105K10
C 487		CEJA330M25
C 488		CEJA330M25
C 501		CKSQYB103K50
C 502		CKSYB223K50
C 503		CKSQYB223K50
C 504		CKSYB102K50
C 505		CEJA220M16
C 506		CCSQCH101K50
C 507		CKSQYB472K50
C 508		CKSQYB473K50
C 509		CEJA101M6R3
C 511		CKSQYB183K50
C 512		CKSQYB183K50
C 513		CKSQYB102K50
C 514		CCSQCH101K50
C 515		CEAT221M16
C 516		CCSQCH101K50
C 517		CKSQYB103K50
C 551		CFTNA224J50
C 552		CFTNA224J50
C 553		CFTNA224J50
C 554		CFTNA224J50
C 555		CEJA330M10
C 557		CFTNA105J50
C 558		CEJA100M16
C 559		CKSYB104K50
C 560	3300µF/16V	CCH1018
C 561		CKSQYB473K50
C 601		CCSQCH270J50
C 602		CCSQCH270J50
C 603		CKSQYB105K10
C 605		CEJA4R7M35
C 606		CCSQCH101K50
C 607		CCSQCH101K50
C 608		CCSCH101J50
C 613		CKSQYB224K16
C 652		CCSQCH101K50
C 653		CEJA4R7M35
C 654		CKSQYB473K50
C 851		CKSQYB473K50
C 853		CKSQYB473K50

Circuit Symbol and No.		Part Name	Part No.
C	881		CKSQYB473K50
C	951	1500µF/16V	CCH1312
C	952		CKSQYB473K50
C	953		CEJA101M10
C	954		CKSQYB473K50
C	955		CEJA101M16
C	956		CKSQYB103K50
C	957	330µF/16V	CCH1326
C	958		CKSYB102K50
C	959		CKSQYB105K16
C	991		CKSQYB473K50
C	992		CKSQYB102K50
C	993		CEJA101M10

A Unit Number : CWM6895(DEH-P47DH/X1M/UC)
Unit Name : Tuner Amp Unit

MISCELLANEOUS

IC	411	IC	HA12187FP
IC	451	IC	PML004AF
IC	501	IC	S-81250SGUP
IC	551	IC	PAL005A
IC	601	IC	PE5106B
IC	631	IC	S-80734AN
Q	411	Transistor	2SA1586
Q	412	Transistor	DTC124EK
Q	432	Transistor	IMH3A
Q	434	Transistor	IMD2A
Q	501	Transistor	2SC2412K
Q	551	Transistor	DTC144EU
Q	601	Transistor	DTA114EU
Q	651	Transistor	2SA933S
Q	653	Transistor	2SA1037K
Q	654	Transistor	DTC114EU
Q	656	Transistor	2SB1243
Q	657	Transistor	DTC114EU
Q	951	Transistor	2SA1037K
Q	952	Transistor	2SC3673
Q	953	Transistor	IMX1
Q	954	Transistor	2SD2396
Q	955	Transistor	2SB1238
Q	956	Transistor	DTC114EK
Q	957	Chip Transistor	2SC2712
Q	958	Transistor	DTC114EK
Q	959	Transistor	IMD2A
Q	991	Transistor	2SD2396
Q	992	Transistor	IMD2A
D	432	Diode	1SS133
D	433	Diode	DAN202U
D	501	Diode	HZS16(1)
D	552	Diode	S1G-6904G2P
D	553	Diode	MPG06G-6415G3
D	651	Diode	MTZ5R6J(C)
D	652	Diode Network	DA204U
D	653	Diode Network	DA204U
D	654	Diode Network	DA204U
D	655	Diode Network	DA204U
D	656	Diode Network	DA204U
D	657	Diode Network	DA204U
D	951	Diode	ERA15-02VH
D	952	Diode	ERA15-02VH
D	955	Diode	DAN202U
D	956	Diode	HZS6L(B2)
D	957	Diode	HZS7L(C2)
D	958	Diode	HZS6L(C3)
D	959	Diode	HZS9L(A2)
D	960	Diode	HZS9L(B3)
D	961	Diode	ERA15-02VH

Circuit Symbol and No.		Part Name	Part No.
D	973	Diode	1SR139-400
D	992	Diode	HZS9L(B1)
L	411	Inductor	LAU3R3J
L	501	Ferri-Inductor	LAU4R7K
L	502	Inductor	CTF1399
L	503	Inductor	CTF1399
L	601	Inductor	LAU100K
L	603	Ferri-Inductor	LAU2R2K
L	604	Ferri-Inductor	LAU2R2K
L	605	Inductor	CTF1399
L	651	Ferri-Inductor	LAU101K
L	951	Ferri-Inductor	LAU2R2K
L	952	Choke Coil 600µH	CTH1221
X	601	Radiator 12.5829MHz	CSS1495
BZ	601	Buzzer	CPV1050
AR	501	Arrester	DSP-201M-S00B
		FM/AM Tuner Unit	CWE1501

RESISTORS

R	411	RS1/10S620J
R	412	RD1/4PU101J
R	413	RS1/10S101J
R	414	RS1/10S222J
R	415	RS1/10S332J
R	416	RS1/10S682J
R	417	RS1/10S102J
R	418	RS1/10S102J
R	419	RS1/10S473J
R	420	RD1/4PU103J
R	421	RS1/10S473J
R	423	RS1/10S821J
R	424	RS1/10S821J
R	425	RS1/10S223J
R	426	RS1/10S223J
R	427	RS1/8S102J
R	428	RS1/10S102J
R	433	RS1/8S821J
R	434	RS1/10S821J
R	445	RS1/10S0R0J
R	446	RS1/10S0R0J
R	451	RS1/10S223J
R	452	RS1/10S223J
R	455	RS1/10S102J
R	457	RS1/10S102J
R	458	RS1/10S102J
R	460	RS1/8S0R0J
R	461	RS1/8S0R0J
R	465	RS1/8S0R0J
R	466	RS1/10S0R0J
R	467	RD1/4PU0R0J
R	468	RD1/4PU0R0J
R	469	RS1/8S0R0J
R	470	RS1/10S0R0J
R	471	RS1/10S0R0J
R	475	RS1/10S0R0J
R	476	RS1/10S0R0J
R	501	RD1/4PU222J
R	502	RS1/10S222J
R	503	RS1/10S393J
R	504	RS1/8S473J
R	505	RS1/10S473J
R	508	RS1/8S681J
R	509	RS1/10S681J
R	510	RS1/10S681J

Circuit Symbol and No.	Part Name	Part No.
R 511		RS1/10S103J
R 512		RD1/4PU681J
R 513		RS1/10S472J
R 514		RS1/10S473J
R 515		RS1/10S272J
R 516		RS1/10S272J
R 517		RS1/10S162J
R 518		RS1/10S162J
R 519		RS1/10S473J
R 520		RS1/8S681J
R 521		RS1/10S473J
R 522		RS1/8S681J
R 523		RD1/4PU151J
R 526		RD1/4PU473J
R 551		RD1/4PU103J
R 552		RS1/10S103J
R 553		RS1/10S331J
R 601		RS1/8S473J
R 603		RS1/10S102J
R 604		RS1/10S101J
R 605		RD1/4PU473J
R 606		RS1/10S473J
R 610		RS1/10S222J
R 612		RD1/4PU222J
R 613		RD1/4PU222J
R 614		RD1/4PU473J
R 615		RD1/4PU473J
R 616		RD1/4PU473J
R 618		RS1/10S333J
R 619		RS1/10S223J
R 622		RS1/10S0R0J
R 623		RD1/4PU102J
R 624		RD1/4PU102J
R 625		RS1/8S102J
R 626		RS1/10S822J
R 628		RD1/4PU102J
R 629		RD1/4PU102J
R 630		RD1/4PU102J
R 631		RS1/10S473J
R 632		RS1/10S0R0J
R 633		RS1/10S0R0J
R 634		RS1/8S0R0J
R 652		RS1/10S222J
R 653		RD1/4PU472J
R 654		RS1/10S222J
R 655		RS1/10S473J
R 656		RS1/8S222J
R 657		RS1/10S222J
R 658		RS1/10S472J
R 659		RD1/4PU472J
R 660		RS1/8S0R0J
R 663		RS1/10S473J
R 664		RD1/4PU152J
R 665		RS1/10S1R0J
R 673		RS1/10S473J
R 674		RD1/4PU272J
R 675		RS2PMF330J
R 676		RS1/10S104J
R 677		RS1/10S473J
R 678		RD1/4PU472J
R 681		RS1/8S681J
R 682		RD1/4PU102J
R 684		RD1/4PU102J
R 685		RS1/10S0R0J
R 686		RS1/8S0R0J

Circuit Symbol and No.	Part Name	Part No.
R 687		RS1/10S0R0J
R 688		RS1/8S0R0J
R 689		RS1/8S0R0J
R 690		RS1/10S473J
R 856		RS1/10S473J
R 857		RS1/10S473J
R 858		RS1/10S473J
R 951		RD1/4PU102J
R 952		RD1/4PU153J
R 953		RD1/4PU472J
R 954		RS1/10S472J
R 955		RD1/4PU102J
R 956		RD1/4PU102J
R 957		RS1/10S101J
R 958		RS1/10S622J
R 959		RS1/10S473J
R 960		RS1/10S473J
R 961		RS1/10S103J
R 962		RS1/10S473J
R 963		RS1/10S472J
R 964		RS1/10S103J
R 965		RS1/10S473J
R 966		RS1/10S473J
R 967		RD1/4PU102J
R 968		RS1/10S102J
R 970		RS1/10S1R0J
R 971		RD1/4PU473J
R 972		RS1/10S103J
R 973		RS1/10S473J
R 974		RS1/10S103J
R 975		RS1/10S473J
R 976		RS1/10S152J
R 991		RD1/4PU221J
R 992		RD1/4PU221J
R 993		RS1/10S472J
R 994		RS1/10S222J

CAPACITORS

C 411		CKSYB104K16
C 412		CKSQYB473K50
C 413		CKSQYB105K10
C 414		CKSYB105K16
C 415		CKSQYB105K10
C 416		CKSYB105K16
C 433		CEJA100M16
C 434		CEJA100M16
C 443		CEJA220M16
C 451		CKSQYB224K16
C 452		CKSYB224K16
C 453		CKSQYB474K16
C 454		CKSQYB474K16
C 455		CEJA470M10
C 456		CKSQYB104K50
C 457		CEJA100M16
C 459		CEJANP4R7M16
C 460		CEJANP4R7M16
C 461		CKSQYB152K50
C 462		CKSQYB152K50
C 463		CEJANP4R7M16
C 464		CEJANP4R7M16
C 465		CKSQYB473K50
C 466		CKSQYB473K50
C 467		CKSQYB473K50
C 468		CKSQYB473K50
C 469		CKSQYB153K50
C 470		CKSQYB333K50
C 471		CKSQYB123K50
C 472		CKSQYB473K50

=====Circuit Symbol and No.		===Part Name	Part No.
C	473		CKSQYB153K50
C	501		CKSQYB103K50
C	502		CKSYB223K50
C	503		CKSQYB223K50
C	504		CKSYB102K50
C	505		CEJA220M16
C	506		CCSQCH101K50
C	507		CKSQYB472K50
C	508		CKSQYB473K50
C	509		CEJA101M6R3
C	511		CKSQYB183K50
C	512		CKSQYB183K50
C	513		CKSQYB102K50
C	514		CCSQCH101K50
C	515		CEAT221M16
C	516		CCSQCH101K50
C	517		CKSQYB103K50
C	551		CFTNA224J50
C	552		CFTNA224J50
C	553		CFTNA224J50
C	554		CFTNA224J50
C	555		CEJA330M10
C	557		CFTNA105J50
C	558		CEJA100M16
C	559		CKSYB104K50
C	560	3300µF/16V	CCH1018
C	561		CKSQYB473K50
C	601		CCSQCH270J50
C	602		CCSQCH270J50
C	603		CKSQYB105K10
C	605		CEJA4R7M35
C	606		CCSQCH101K50
C	607		CCSQCH101K50
C	608		CCSCH101J50
C	613		CKSQYB224K16
C	652		CCSQCH101K50
C	653		CEJA4R7M35
C	654		CKSQYB473K50
C	951	1500µF/16V	CCH1312
C	952		CKSQYB473K50
C	953		CEJA101M10
C	954		CKSQYB473K50
C	955		CEJA101M16
C	956		CKSQYB103K50
C	957	330µF/16V	CCH1326
C	958		CKSYB102K50
C	959		CKSQYB105K16
C	991		CKSQYB473K50
C	992		CKSQYB102K50
C	993		CEJA101M10

C

Unit Number : CWM6896(DEH-P77DH/X1M/UC)
: CWM7030(DEH-P47DH/X1M/UC)
Unit Name : Keyboard Unit

MISCELLANEOUS

IC	901	IC	PD6279A
IC	902	IC(DEH-P77DH/X1M/UC)	TSOP1840SB1
Q	901	Transistor	DTC143EU
D	901	Diode	DAN202U
D	902	Diode	DAP202U
D	903	LED	NSSW440-9159
D	904	LED	NSSW440-9159
D	905	LED	NSSW440-9159
D	906	LED	NSSW440-9159
D	910	LED	CL170FGCD

=====Circuit Symbol and No.		===Part Name	Part No.
D	911	LED	CL170FGCD
D	912	LED	CL170FGCD
D	913	LED	CL170FGCD
D	914	LED	CL170FGCD
D	915	LED	CL220FGCD
D	916	LED	CL220FGCD
D	917	LED	CL170UBX
L	901	Inductor	LCTA101J3225
X	901	Radiator 5.00MHz	CSS1423
S	901	Push Switch	CSG1143
S	902	Push Switch	CSG1111
S	903	Push Switch	CSG1111
S	904	Push Switch	CSG1143
S	905	Push Switch	CSG1129
S	906	Push Switch	CSG1127
S	907	Push Switch	CSG1127
S	908	Push Switch	CSG1127
S	909	Push Switch	CSG1127
S	910	Push Switch	CSG1127
S	911	Push Switch	CSG1127
S	912	Push Switch	CSG1143
S	913	Push Switch	CSG1127
S	914	Push Switch	CSG1127
S	915	Push Switch	CSG1127
S	916	Push Switch	CSG1143
S	917	Push Switch	CSG1127
S	918	Push Switch	CSG1127
S	919	Push Switch	CSG1127
S	920	Push Switch	CSG1127
S	921	Switch	CSD1040

RESISTORS

R	901		RS1/10S222J
R	902		RS1/10S222J
R	903		RS1/10S472J
R	904	(DEH-P77DH/X1M/UC)	RS1/10S151J
R	905		RS1/10S470J
R	906		RS1/10S470J
R	907		RS1/8S821J
R	908		RS1/8S821J
R	909		RS1/8S181J
R	911		RS1/8S181J
R	913		RS1/8S181J
R	915		RS1/8S181J
R	917		RS1/8S181J
R	919		RS1/8S181J
R	921		RS1/10S103J
R	923		RS1/4S821J
R	924		RS1/4S821J
R	925		RS1/4S821J
R	926		RS1/4S821J
R	929		RS1/8S681J
R	930		RS1/8S681J
R	931		RS1/8S681J
R	932		RS1/8S681J
R	933		RS1/8S181J
R	935		RS1/8S751J
R	936		RS1/8S751J
R	937	(DEH-P47DH/X1M/UC)	RS1/10S473J

CAPACITORS

C	903	(DEH-P77DH/X1M/UC)	CKSYB106K6R3
C	904		CKSQYB103K50
C	905		CKSQYB103K50
C	906		CKSQYB103K50
C	907		CKSQYB104K50

Circuit Symbol and No.		Part Name	Part No.
C	908		CKSQYB104K50
C	909		CKSQYB104K50
C	910		CKSQYB104K50
C	913		CKSQYB104K50

B Unit Number : CWE1501
Unit Name : FM/AM Tuner Unit

MISCELLANEOUS

IC	1	IC	PML002A
IC	2	IC	PM4008A
IC	3	IC	BR9010FV
Q	1	Transistor	2SC4081
Q	2	Transistor	DTC124EU
Q	3	FET	3SK263
Q	51	Transistor	2SC4081
Q	201	FET	2SK932
Q	202	Transistor	DTC124EU
Q	204	Transistor	2SC4081
D	1	Diode	KV1410(23)
D	2	Diode	1SV248
D	6	Diode	KV1410(23)
D	201	Diode	DAN217U
D	202	Diode	DAN217U
D	903	Diode	KV1410(23)
D	904	Diode	SVC253
L	1	Coil	CTC1155
L	3	Inductor	LCTB1R5K2125
L	4	Coil	CTC1155
L	201	Inductor	LCTB330M1608
L	202	Inductor	CTF1287
L	203	Inductor	LCTA121J3225
L	901	Coil	CTC1154
L	902	Inductor	LCTA3R3J3225
L	904	Inductor	LCTBR47M1608
L	905	Inductor	LCTBR47M1608
T	51	Coil	CTE1132
CF	51	Ceramic Filter	CTF1442
CF	52	Ceramic Filter	CTF1442
CF	53	Ceramic Filter	CTF1442
CF	202	Ceramic Filter	CTF1348
X	901	Crystal Resonator 10.250MHz	CSS1432

RESISTORS

R	1	RS1/16S183J
R	2	RS1/16S103J
R	5	RS1/16S0R0J
R	7	RS1/16S273J
R	8	RS1/16S473J
R	9	RS1/16S223J
R	10	RS1/16S473J
R	11	RS1/16S221J
R	12	RS1/16S103J
R	13	RS1/16S104J
R	16	RS1/16S223J
R	17	RS1/16S221J
R	18	RS1/16S221J
R	19	RS1/16S473J
R	20	RS1/16S470J
R	31	RS1/16S0R0J
R	51	RS1/16S470J
R	52	RS1/16S103J
R	53	RS1/16S103J
R	54	RS1/16S331J
R	55	RS1/16S331J
R	56	RS1/16S560J
R	57	RS1/16S560J
R	58	RS1/16S102J
R	59	RS1/16S225J
R	60	RS1/16S133J
R	61	RS1/16S433J
R	101	RS1/16S333J
R	102	RS1/16S103J
R	103	RS1/16S333J
R	104	RS1/16S562J
R	110	RS1/16S154J
R	111	RS1/16S273J
R	113	RS1/16S222J
R	114	RS1/16S333J
R	115	RS1/16S334J
R	116	RS1/16S473J
R	202	RS1/16S472J
R	203	RS1/16S225J
R	204	RS1/16S102J
R	205	RS1/16S220J
R	206	RS1/16S471J
R	208	RS1/16S104J
R	209	RS1/16S104J
R	210	RS1/16S563J
R	213	RS1/16S223J
R	251	RS1/16S225J
R	902	RS1/16S103J
R	904	RS1/16S473J
R	907	RS1/16S103J
R	908	RS1/16S681J
R	909	RS1/16S473J
R	914	RS1/16S562J

CAPACITORS

C	1	CCSQCH4R0C50
C	6	CKSQYB105K10
C	8	CKSRYB222K50
C	10	CCSRCH220J50
C	11	CCSRCH150J50
C	12	CCSRCH8R0D50
C	14	CCSRCJ3R0C50
C	15	CKSRYB103K50
C	16	CKSRYB222K50
C	17	CKSRYB222K50
C	18	CCSRCJ3R0C50
C	19	CKSRYB103K50
C	20	CKSRYB103K50
C	21	CKSRYB103K50
C	24	CKSQYB334K16
C	26	CKSRYB472K50
C	30	CCSRCH220J50
C	32	CCSRCH470J50
C	35	CKSRYB103K50
C	51	CKSRYB103K50
C	52	CKSRYB473K16
C	53	CCSRCK2R0C50
C	54	CKSRYB103K50
C	55	CKSRYB104K16
C	56	CKSRYB104K16
C	58	CKSQYB224K16
C	101	CEALNP100M10
C	102	CCSRCH151J50
C	103	CKSRYB473K16
C	105	CKSRYB682K25

=====Circuit Symbol and No.		===Part Name	Part No.
C	106		CEALR68M50
C	107		CKSRYB103K50
C	108		CKSQYB474K16
C	109		CKSQYB474K16
C	110		CKSRYB104K16
C	111		CKSRYB104K16
C	112		CKSRYB104K16
C	113		CKSRYB123K25
C	114		CEAL220M6R3
C	115		CKSRYB473K16
C	116		CEAL2R2M50
C	117		CKSRYB102K50
C	120		CKSRYB183K25
C	121		CKSRYB332K50
C	122		CKSRYB562K25
C	123		CKSRYB681K50
C	125		CKSRYB103K50
C	126		CKSRYB103K50
C	127		CEAL2R2M50
C	128		CKSRYB103K50
C	201		CCSRCH471J50
C	202		CCSRCH100D50
C	203		CKSRYB104K16
C	204		CKSRYB332K50
C	205		CKSRYB103K50
C	206		CKSRYB104K16
C	207		CKSRYB473K16
C	208		CCSRCH560J50
C	209		CEAL470M6R3
C	210		CKSRYB103K50
C	211		CKSRYB103K50
C	212		CCSRCH101J50
C	215		CKSRYB223K25
C	216		CKSQYB334K16
C	217		CKSRYB103K50
C	219		CKSQYB105K10
C	220		CKSRYB104K16
C	221		CKSRYB473K16
C	222		CKSQYB334K16
C	223		CKSQYB474K16
C	224		CKSRYB104K16
C	225		CKSRYB272K50
C	226		CKSRYB682K25
C	902		CCSRCH270J50
C	904		CKSRYB223K25
C	905		CKSRYB103K50
C	906		CCSRTH100D50
C	907		CCSRTH150J50
C	909		CCSRTH100D50
C	910		CKSRYB332K50
C	912		CKSQYB474K16
C	913		CKSRYB223K25
C	914		CKSRYB682K25
C	915		CKSQYB223K25
C	916		CKSQYB474K16
C	917		CKSYB475K10
C	918		CKSRYB223K25
C	919		CKSQYB225K10
C	920		CCSRCH270J50
C	921		CCSRCH270J50
C	922		CKSYB105K16
C	923		CKSRYB103K50

D Unit Number : CWX2411
Unit Name : Control Unit

=====Circuit Symbol and No.		===Part Name	Part No.
MISCELLANEOUS			
IC	201	IC	UPD63711GC
IC	301	IC	BA5985FM
IC	701	IC	BA05SFP
Q	101	Transistor	2SB1132
D	801	LED	CL200IRX
D	802	LED	CL200IRX
X	201	Ceramic Oscillator 16.934MHz	CSS1456
S	801	Spring Switch(HOME)	CSN1051
S	802	Spring Switch(CLAMP)	CSN1052
RESISTORS			
R	101		RS1/8S120J
R	102		RS1/8S100J
R	103		RS1/16S222J
R	201		RS1/16S104J
R	202		RS1/16S103J
R	203		RS1/16S393J
R	204		RS1/16S103J
R	205		RS1/16S103J
R	206		RS1/16S182J
R	207		RS1/16S123J
R	302		RS1/16S153J
R	303		RS1/16S103J
R	501		RS1/16S102J
R	502		RA4C681J
R	601		RS1/16S102J
R	602		RS1/16S102J
R	605		RS1/16S0R0J
R	606		RS1/16S0R0J
R	801		RS1/8S751J
R	803		RS1/8S751J
R	902		RS1/16S0R0J
R	906		RS1/16S0R0J
CAPACITORS			
C	101		CKSRYB102K50
C	102		CKSRYB104K16
C	103		CEV101M6R3
C	104		CEV470M6R3
C	105		CKSQYB334K16
C	106		CKSQYB334K16
C	107		CKSQYB334K16
C	201		CKSRYB104K16
C	202		CKSRYB471K50
C	203		CKSRYB104K16
C	205		CEV101M6R3
C	206		CKSRYB104K16
C	207		CKSRYB104K16
C	208		CKSRYB104K16
C	209		CKSRYB104K16
C	210		CKSRYB332K50
C	211		CKSRYB104K16
C	212		CKSRYB104K16
C	213		CKSRYB392K50
C	214		CKSRYB104K16
C	215		CKSRYB104K16
C	216		CCSRCJ3R0C50
C	217		CCSRCH270J50
C	218		CKSRYB104K16
C	219		CCSRCH181J50

=====Circuit Symbol and No.		===Part Name	Part No.
C	220		CCSRCH510J50
C	221		CKSRYB682K25
C	222		CEV220M6R3
C	223		CKSRYB103K25
C	224		CKSRYB224K10
C	301		CEV101M10
C	603		CCSQSL152J50
C	604		CCSQSL152J50
C	702	10µF/10V	CCH1349
C	703		CKSQYB334K16

E Unit Number :
Unit Name : Photo Unit(S8)

Q	1	Photo-transistor	CPT230SX-TU
Q	2	Photo-transistor	CPT230SX-TU

Miscellaneous Parts List

		Pickup Unit(Service)(P8)	CXX1285
M	1	Motor Unit(CARRIAGE)	CXB2190
M	2	Motor Unit(LOADING)	CXB2195
M	3	Motor Unit(SPINDLE)	CXB2562

6. ADJUSTMENT

6.1 CD ADJUSTMENT

1) Precautions

- This unit uses a single power supply (+5V) for the regulator. The signal reference potential, therefore, is connected to REFO(approx. 2.5V) instead of GND.
  If REFO and GND are connected to each other by mistake during adjustments, not only will it be impossible to measure the potential correctly, but the servo will malfunction and a severe shock will be applied to the pick-up. To avoid this, take special note of the following.
  Do not connect the negative probe of the measuring equipment to REFO and GND together. It is especially important not to connect the channel 1 negative probe of the oscilloscope to REFO with the channel 2 negative probe connected to GND.
  Since the frame of the measuring instrument is usually at the same potential as the negative probe, change the frame of the measuring instrument to floating status.
  If by accident REFO comes in contact with GND, immediately switch the regulator or power OFF.

- Always make sure the regulator is OFF when connecting and disconnecting the various filters and wiring required for measurements.

- Before proceeding to further adjustments and measurements after switching regulator ON, let the player run for about one minute to allow the circuits to stabilize.

- Since the protective systems in the unit's software are rendered inoperative in test mode, be very careful to avoid mechanical and /or electrical shocks to the system when making adjustment.

- Disc detection during loading and eject operations is performed by means of a photo transistor in this unit.Consequently, if the inside of the unit is exposed to a strong light source when the outer casing is removed for repairs or adjustment, the following malfunctions may occur.
  *During PLAY, even if the eject button is pressed,the disc will not be ejected and the unit will remain in the PLAY mode.
  *The unit will not load a disc.
  When the unit malfunctions this way, either re-position the light source, move the unit or cover the photo transistor.

2) Test Mode

This mode is used for adjusting the CD mechanism module of the device.

- Test mode starting procedure
  Reset while pressing the **4** and **6** keys together.

- Test mode cancellation
  Switch ACC, back-up OFF.

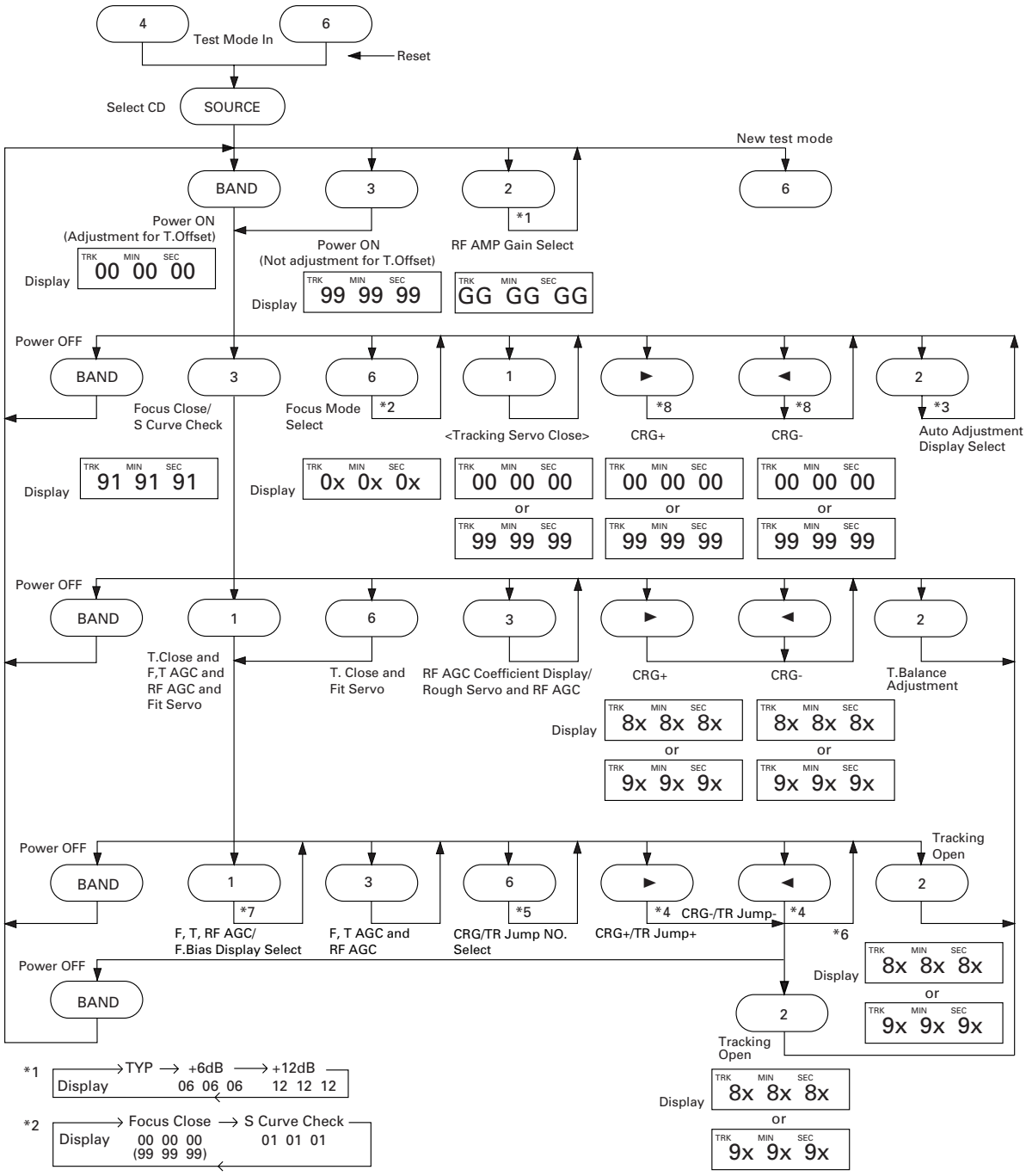
- After pressing the EJECT key, do not press any other key until the disk is completely ejected.

- If the ► or ◄ key is pressed while focus search is in progress, immediately turn the power off (otherwise the actuator may be damaged due to adhesion of the lenses).

- Jump operation of TRs other than 100TR continues after releasing the key. CRG move and 100TR jump operations are brought into the “Tracking close” status when the key is released.

- Powering Off/On resets the jump mode to “Single TR (91)”, the RF AMP gain setting to 0 dB, and the automatic adjustment value to the initial value.

● Flow Chart


4
Test Mode In
6
Reset
Select CD
SOURCE
New test mode
BAND
3
2
6
*1
Power ON
(Adjustment for T.Offset)
Display
TRK MIN SEC
00 00 00
Power ON
(Not adjustment for T.Offset)
Display
99 99 99
GG GG GG
RF AMP Gain Select
Power OFF
BAND
3
6
1
►
◄
2
Focus Close/
S Curve Check
Focus Mode
Select
*2
*8
*8
*3
<Tracking Servo Close>
CRG+
CRG-
Auto Adjustment
Display Select
Display
91 91 91
Display
0x 0x 0x
00 00 00
or
99 99 99
00 00 00
or
99 99 99
00 00 00
or
99 99 99
Power OFF
BAND
1
6
3
►
◄
2
T.Close and
F,T AGC and
RF AGC and
Fit Servo
T. Close and
Fit Servo
RF AGC Coefficient Display/
Rough Servo and RF AGC
CRG+
CRG-
T.Balance
Adjustment
Display
8x 8x 8x
or
9x 9x 9x
8x 8x 8x
or
9x 9x 9x
Power OFF
Tracking
Open
BAND
1
3
6
►
◄
2
*7
*5
*4
CRG-/TR Jump-
*4
*6
F, T, RF AGC/
F.Bias Display Select
F, T AGC and
RF AGC
CRG/TR Jump NO.
Select
CRG+/TR Jump+
Power OFF
BAND
Display
8x 8x 8x
or
9x 9x 9x
2
Tracking
Open
Display
8x 8x 8x
or
9x 9x 9x
*1 → TYP → +6dB → +12dB
Display 06 06 06 12 12 12
*2 → Focus Close → S Curve Check
Display 00 00 00 (99 99 99) 01 01 01
*3 → F.Offset Display → RF.Offset Display → F.Cansel Display
F.Cancel Value = {Top Rank 8bit of Set Value (7F [H] to 80 [H]) + 128} / 4
= 63 [D] to (32 [D]) to 00 [D]
*4 Single TR/32TR/100TR
*5 → Single TR → 32TRK → 100TRK → CRG Move
Display 9x(8x):91(81) 92(82) 93(83) 94(84)
*6 CRG Move, 100TR Jump Only
*7 → TRK, MIN, SEC → F.AGC Gain → T.AGC Gain → RF AGC Gain
(F,T.AGC Gain = (Present Value/Initial Value) × 20)
*8 Voltage of CRG Motor = 2 [V]

6.2 CHECKING THE GRATING AFTER CHANGING THE PICKUP UNIT

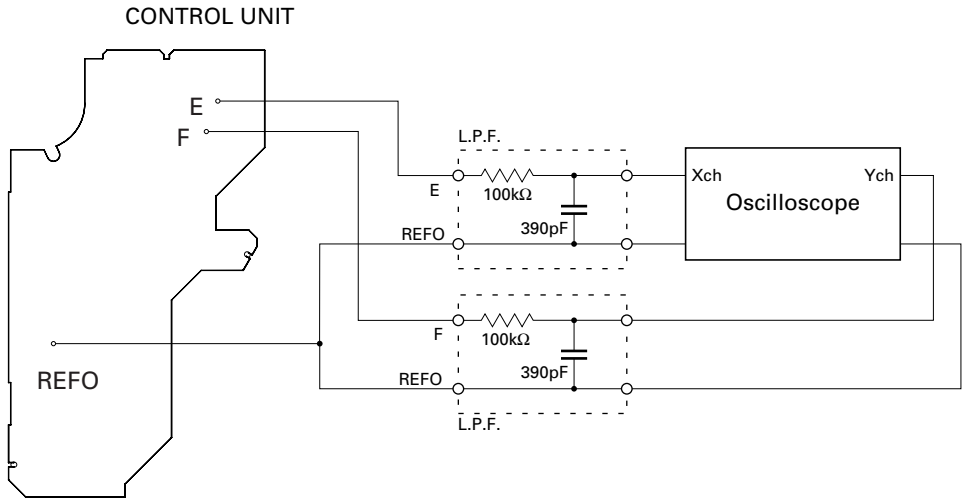
• **Note :**
The grating angle of the PU unit cannot be adjusted after the PU unit is changed. The PU unit in the CD mechanism module is adjusted on the production line to match the CD mechanism module and is thus the best adjusted PU unit for the CD mechanism module. Changing the PU unit is thus best considered as a last resort. However, if the PU unit must be changed, the grating should be checked using the procedure below.

• **Purpose :**
To check that the grating is within an acceptable range when the PU unit is changed.

• **Symptoms of Mal-adjustment :**
If the grating is off by a large amount symptoms such as being unable to close tracking, being unable to perform track search operations, or taking a long time for track searching.

• **Method :**

• Measuring Equipment	• Oscilloscope, Two L.P.F.
• Measuring Points	• E, F, REFOUT
• Disc	• ABEX TCD-784
• Mode	• TEST MODE



• **Checking Procedure**
1. In test mode, load the disc and switch the 5V regulator on.
2. Using the ► and ◄ buttons, move the PU unit to the innermost track.
3. Press key **3** to close focus, the display should read "91". Press key **2** to implement the tracking balance adjustment the display should now read "81". Press key **3** 2 times. The display will change, returning to "81" on the fourth press.
4. As shown in the diagram above, monitor the LPF outputs using the oscilloscope and check that the phase difference is within 75° . Refer to the photographs supplied to determine the phase angle.
5. If the phase difference is determined to be greater than 75° try changing the PU unit to see if there is any improvement. If, after trying this a number of times, the grating angle does not become less than 75° then the mechanism should be judged to be at fault.

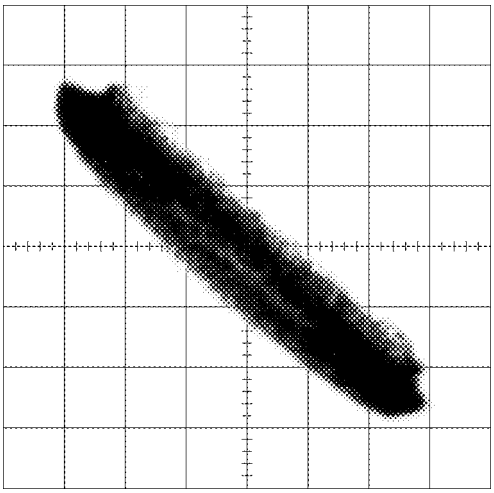
• **Note**
Because of eccentricity in the disc and a slight misalignment of the clamping center the grating waveform may be seen to "wobble" (the phase difference changes as the disc rotates). The angle specified above indicates the average angle.

• **Hint**
Reloading the disc changes the clamp position and may decrease the "wobble".

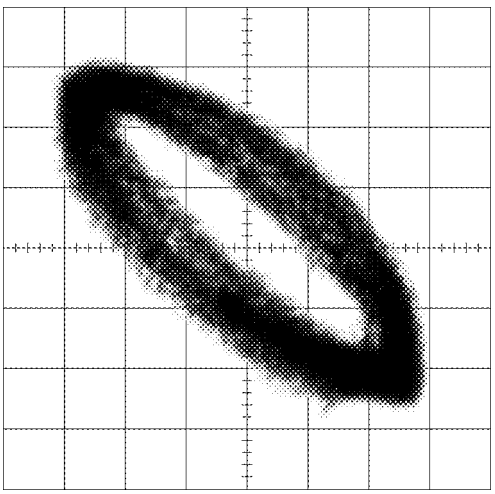
Grating waveform

Ech → Xch 20mV/div, AC
Fch → Ych 20mV/div, AC

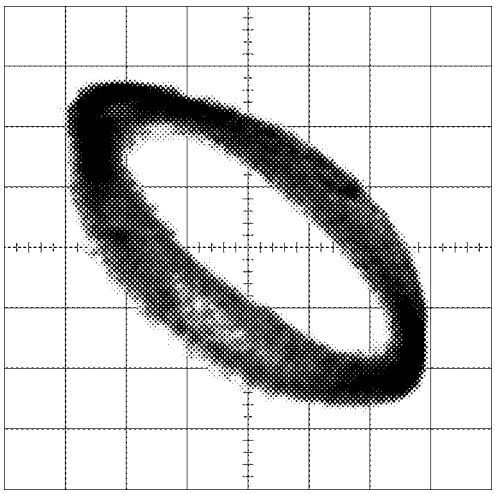
0°



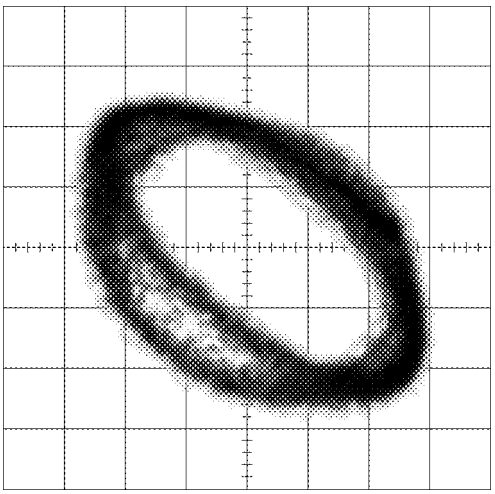
30°



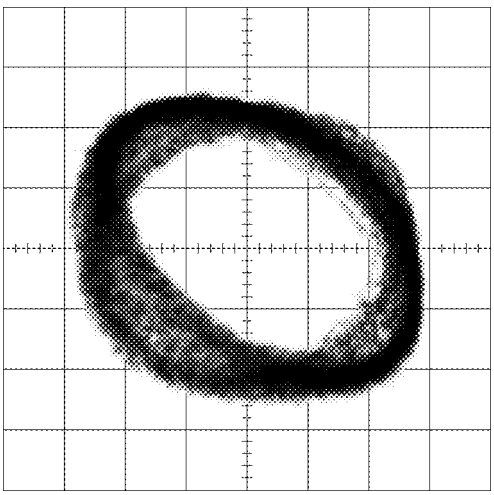
45°



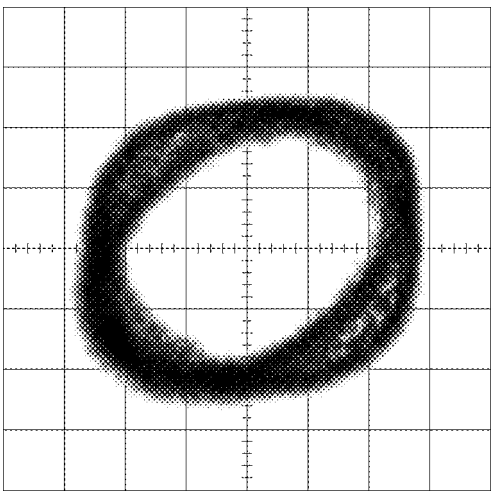
60°



75°



90°



7. GENERAL INFORMATION

7.1 DIAGNOSIS

7.1.1 TEST MODE

● Error Messages

If a CD is not operative or stopped during operation due to an error, the error mode is turned on and cause(s) of the error is indicated with a corresponding number. This arrangement is intended at reducing nonsense calls from the users and also for facilitating trouble analysis and repair work in servicing.

(1) Basic Indication Method

1) When SERRORM is selected for the CSMOD (CD mode area for the system), error codes are written to DMIN (minutes display area) and DSEC (seconds display area). The same data is written to DMIN and DSEC. DTNO remains in blank as before.

2) Head unit display examples

Depending on display capability of LCD used, display will vary as shown below. xx contains the error number.

8-digit display	6-digit display	4-digit display
ERROR–xx	ERR–xx OR Err–xx	E–xx

(2) Error Code List

Code	Class	Displayed error code	Description of the code and potential cause(s)
10	Electricity	Carriage Home NG	CRG can't be moved to inner diameter. CRG can't be moved from inner diameter. → Failure on home switch or CRG move mechanism.
11	Electricity	Focus Servo NG	Focusing not available. → Stains on rear side of disc or excessive vibrations on REWRITABLE.
12	Electricity	Spindle Lock NG	Spindle not locked. Sub-code is strange (not readable). → Failure on spindle, stains or damages on disc, or excessive vibrations.
		Subcode NG	A disc not containing CD-R data is found. Turned over disc are found, though rarely. → Failure on home switch or CRG move mechanism.
		RF AMP NG	An appropriate RF AMP gain can't be determined. → CD signal error.
17	Electricity	Setup NG	APC protection doesn't work. Focus can be easily lost. → Damages or stains on disc, or excessive vibrations.
30	Electricity	Search Time Out	Failed to reach target address. → CRG tracking error or damages on disc.
A0	System	Power Supply NG	Power (VD) is ground faulted. → Failure on SW transistor or power supply (failure on connector).

Remarks: Mechanical errors are not displayed (because a CD is turned off in these errors).
Unreadable TOC does not constitute an error. An intended operation continues in this case.
A newly designed head unit must conform to the example given above.
Upper digits of an error code are subdivided as shown below:
1x: Setup relevant errors, 3x: Search relevant errors, 3x: Search relevant errors, Ax: Other errors.

● New Test Mode

S-CD plays the same way as before.

If an error such as off focus, spindle unlocking, unreadable sub-code, or sound skipping occurs after setup, its cause and time occurred (in absolute time) are displayed.

During setup, operational status of the control software (internal RAM: CPOINT) is displayed.

These displays and functions are prepared for enhancing aging in the servicing and efficiency of trouble analysis.

(1) Shifting to the New Test Mode

① Turn on the current test mode by starting the reset from the key.

② Select S-CD for the source through the specified procedure including use of the [SOURCE] key, and inserting the disc. Then, press the [Jump Mode Selector] key while maintaining the regulator turned off.

③ After the above operations, the new test mode remains on irrespective of whether the S-CD is turned on or off. You can reset the new test mode by turning on the reset start.

* With some products, the new test mode can be reset through the same operations as that employed for shifting to the STBY mode (while maintaining the Acc turned off).

(2) Key Correspondence

Key	Test mode		New test mode	
(Example)	Power Off	Power On	In-play	Error Production
BAND	To power on (offset adjustment performed)	To power off	–	Time/Err.No. switching
►	–	FWD-Kick	FF/TR+	–
◄	–	REV-Kick	REV/TR-	–
1	–	T.Close (AGC performed) /parameter display switching	Scan	–
2	RF AMP gain switching	Parameter display switching /T.BAL adjustment/T.Open	Mode	–
3	To power on (offset adjustment not performed)	F.Close/RF AGC/F.T.AGC	–	–
6	–	F.Mode switching /T.Close (no AGC)/Jump switching	Auto/Manu	T.No./Time switching

Note: Eject and CD on/off is performed in the same procedure as that for the normal mode.

(3) Cause of Error and Error Code

Code	Class	Contents	Description and cause
40	Electricity	Off focus detected.	FOK goes low. → Damages/stains on disc, vibrations or failure on servo.
41	Electricity	Spindle unlocked.	FOK = Low continued for 50 msec. → Damages/stains on disc, vibrations or failure on servo.
42	Electricity	Sub-code unreadable.	Sub-code was unreadable for 50 msec. → Damages/stains on disc, vibrations or failure on servo.
43	Electricity	Sound skipping detected.	Last address memory function was activated. → Damages/stains on disc, vibrations or failure on servo.

Note: Mechanical errors during aging are not displayed.
The error codes should be indicated in the same way as in the normal mode.

(4) Display of Operational Status (CPOINT) during Setup

Status No.	Contents	Protective action
00	CD+5V ON process in progress.	None
01	Servo LSI initialization (1/3) in progress.	None
02	Servo LSI CRAM initialization in progress.	None
03	Servo LSI initialization (2/3) in progress.	None
04	Offset adjustment (1/3) in progress.	None
05	Offset adjustment (2/3) in progress.	None
06	Offset adjustment (3/3) in progress.	None
07	FZD adjustment in progress.	None
08	Servo LSI initialization (3/3) in progress.	None
10	Carriage move to home position started.	None
11	Carriage move to home position started.	None
12	Carriage is moving toward inner diameter.	Specified 10 seconds has been passed or failure on home switch.
13	Carriage is moving toward outer diameter.	Specified 10 seconds has been passed or failure on home switch.
14	Carriage outer kick in progress.	None
15	Carriage outer diameter feed (1 second) in progress.	None
20	Servo close started.	None
21	Pre-processing for focus search started.	None
22	Spindle rotation and focus search started.	None
23	Waiting for focus close (XSI=Low).	Specified focus search time has been passed.
24	Standing by after focus close is over.	Specified focus search time has been passed.
25	Focus search preprocessing is in progress while setup protection is turned on.	None
26	Focus search preprocessing is in progress while focus recovery is turned on.	None
27	Wait time after focus close is set up.	Off focus.
28	Standing by after focus close is over.	Off focus.
29	Setup (1/2) before T balance adjustment is started.	Off focus.
30	Setup (2/2) before T balance adjustment is started.	Off focus.
31	T balance adjustment started.	Off focus.
32	T balance adjustment (1/2).	Off focus.
33	T balance adjustment (2/2).	Off focus.
34	Waiting for spindle rotation to end. Spindle rough servo.	Off focus.
35	Standing by after spindle rough servo is over.	Off focus.
36	RF AGC started.	Off focus.
37	RF AGC started.	Off focus.
38	RF AGC ending process in progress.	Off focus.
39	Tracking close in progress.	Off focus.
40	Standing by after tracking is closed. Carriage closing in progress.	Off focus.
41	Focus/tracking AGC started.	Off focus.
42	Focus AGC started.	Off focus.
43	Focus AGC in progress.	Off focus.
44	Tracking AGC in progress.	Off focus.
45	Standing by after focus/tracking AGC are over.	Off focus.
46	Spindle processes applicable servo.	Off focus.
47	Check for servo close is started.	Off focus.
48	Check of LOCK pin started.	Off focus or spindle not locked.
49	RF AGC started.	Off focus.
50	RF AGC in progress.	Off focus.
51	Standing by after RF AGC is over.	Off focus.

(5) Display Examples

1) During Setup (When status no. = 11)

TRK No.	MIN.	SEC.
11	11'	11"

2) During Operation (TOC read, TRK search, Play, FF and REV)

The same as in the normal mode.

3) When a Protection Error Occurred

Switch to the following displays (A) and (B) using the [BAND] switch:

(A) Error occurrence timing display in absolute time.

An example: Error occurred in 12th tune at 34'56" in absolute time.

TRK No.	MIN.	SEC.
12	34'	56"

(B) Error No. display

An example: Error #40 (Off focus is detected)

ERROR-40

7.1.2 DISASSEMBLY

● Removing the Upper Case (Fig.1)

1 Remove the five screws and then remove the upper case.

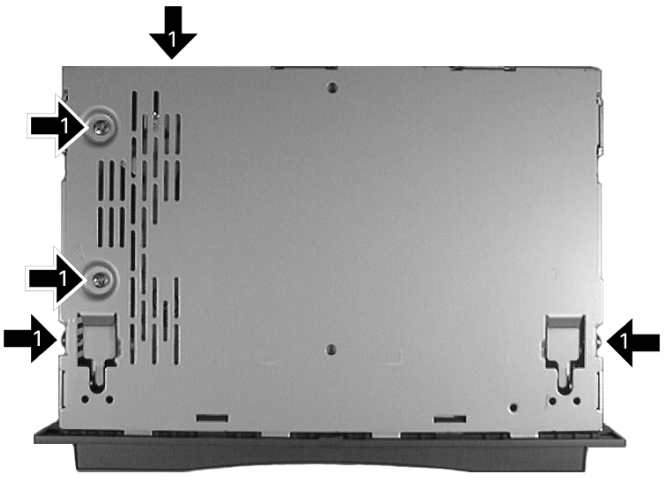


Fig.1

● **Removing the CD Mechanism Module (Fig.2)**

1 Remove the four screws.

Disconnect the connector and then remove the CD Mechanism Module (not shown).

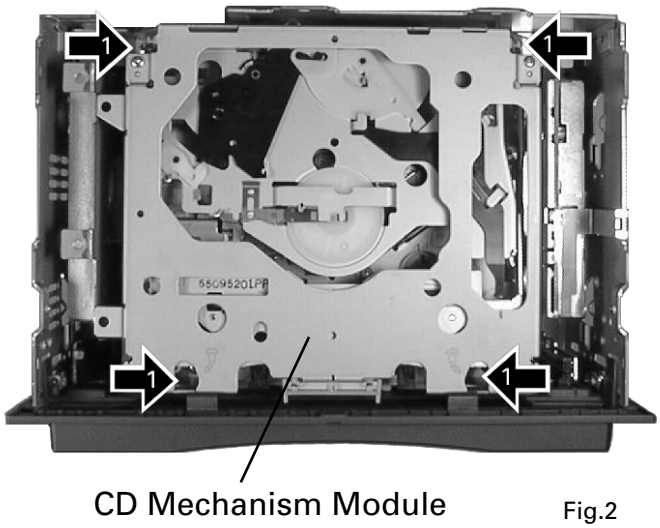


Fig.2

● **Removing the Panel Assy and the Chassis Unit (Fig.3)**

1 Remove the three screws.

Disconnect the two stoppers and then remove the Panel Assy (not shown).

2 Remove the four screws and then remove the Chassis Unit. (If the Panel Assy is not removed, the Chassis Unit cannot be removed.)

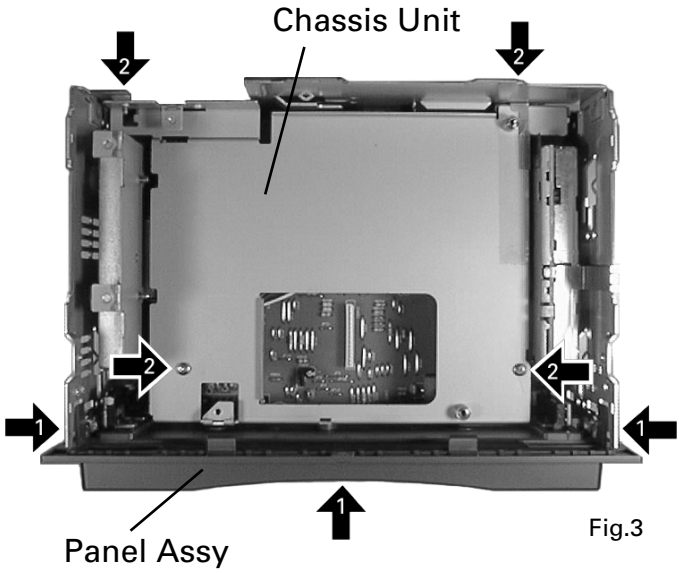


Fig.3

● **Removing the Tuner Amp Unit (Fig.4)**

1 Remove the two screws.

2 Remove the three screws.

3 Remove the screw.

4 Disconnect the four claws and then remove the Tuner Amp Unit.

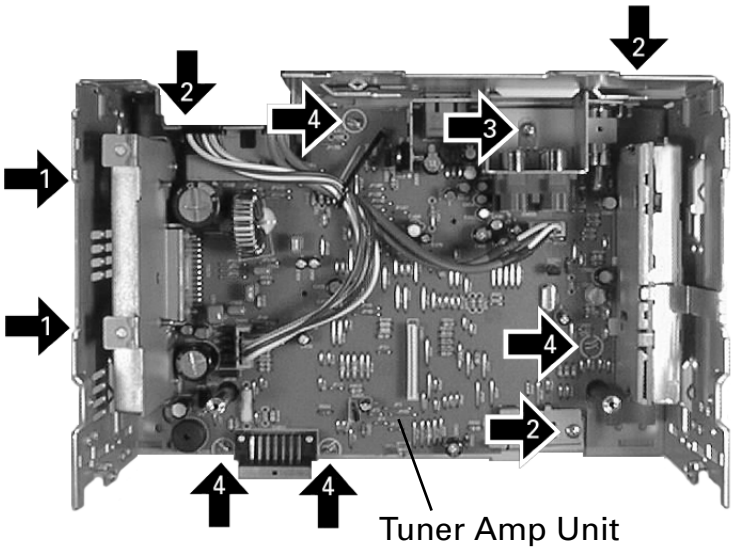
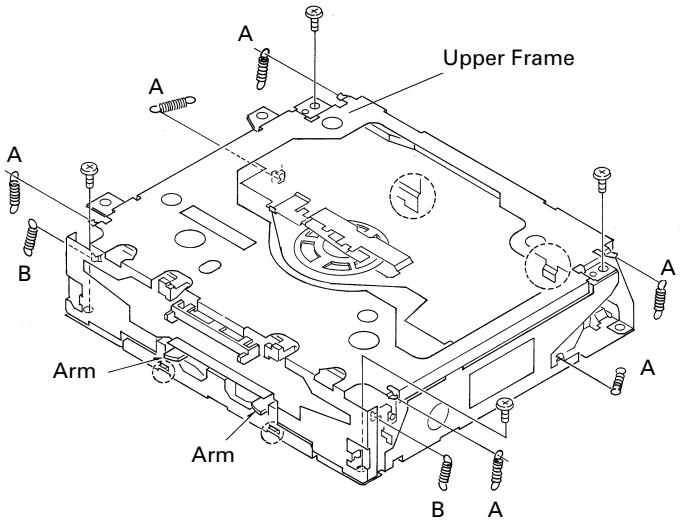


Fig.4

● Removing the Upper Frame

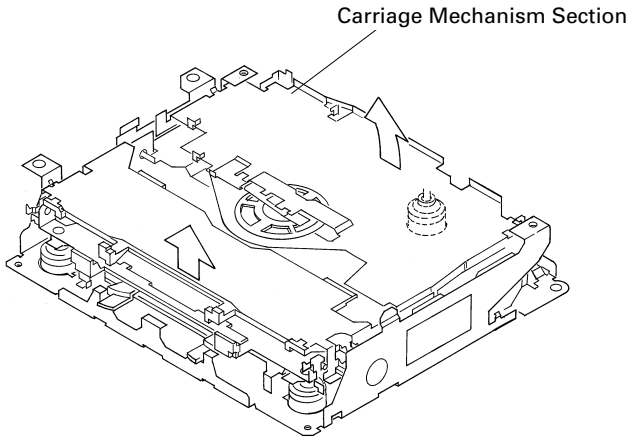
1. Remove six Springs A, two Springs B and four Screws.
2. Remove two Tabs situated on rear side of the Upper Frame, remove two Arms on the front side, then remove two Tabs on the front side.



● Removing the Carriage Mechanism

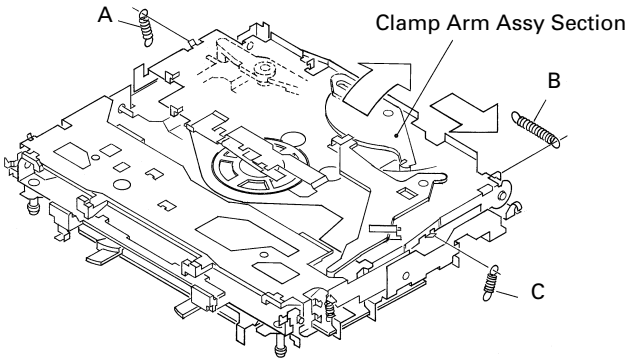
1. Disengage the Carriage Mechanism from the two dampers situated in the front side by driving it up, then disengage and remove the mechanism from the one damper by driving it up aslant into front side direction.

Note : When assembling the Carriage Mechanism, coat the dampers with alcohol prior to the assembly.



● Removing the Clamp Arm Assy

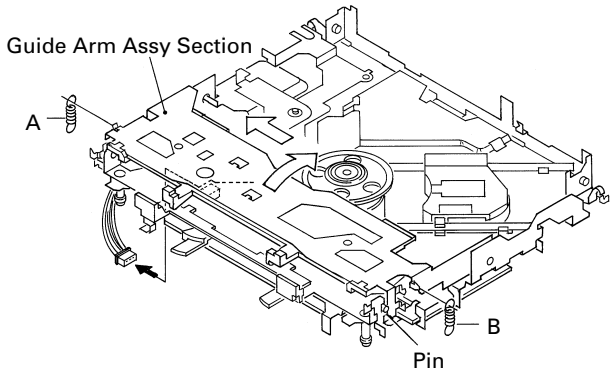
1. Remove a Spring A, a B and a Spring C.
2. Drive the Clamp Arm Assy up into rear side direction, then disengage the arm from its current position Finally, drive the assembly approximately 45 degrees upward, then slide the assembly toward right side to remove it.



● Removing the Guide Arm Assy

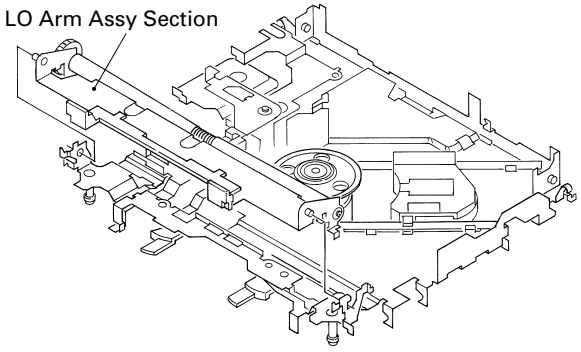
1. Remove a connector, a spring A and B
2. Drive the Guide Arm Assy up aslant into rear side direction, then remove it from a Pin. Finally, drive the assembly approximately 45 degrees upward, then slide the assembly toward left side to remove it.

Note : When assembling the guide arm assembly, route the cord inside the assembly. In this operation, care must be exercised so that cord may be caught by the gear.



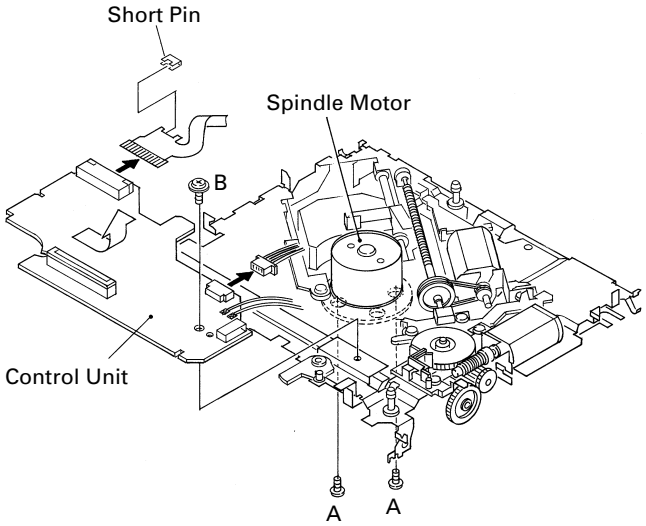
● Removing the LO Arm Assy

1. Remove two Pins to dismount the LO Arm Assy.



● Removing the Control Unit and the Spindle Motor

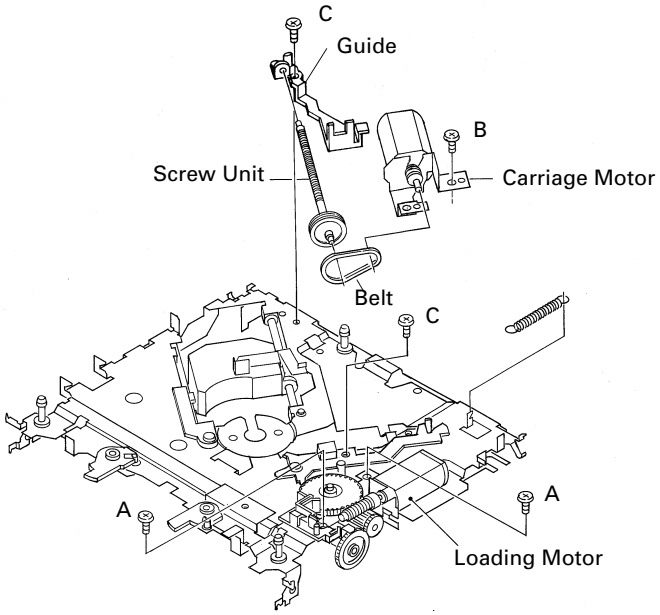
1. Remove from the connector after mounting the short pin on the flexible PCB of the pickup unit.
2. Remove two Soldered joints, then remove two Screws A.
3. Remove two connectors and a Screw B.
4. Disengage the Control Unit from two Tabs, then dismount the unit by sliding it toward left.
5. Dismount the Spindle Motor.



● Removing the Loading Motor and Carriage Motor

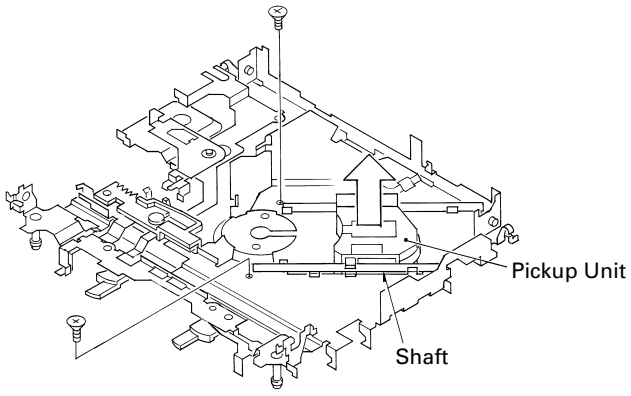
1. Remove the Spring and two Screws A.
2. Dismount the Loading Motor.
3. Remove the Belt, a Screw B, two Screws C, a Guide and a Screw Unit.
4. Dismount the Carriage Motor.

Note : When assembling the Belt, use care so that it may not be contaminated by grease.



● Removing the Pickup Unit

1. Remove two Screws and a Shaft.
2. Dismount the Pickup Unit.



7.2 PARTS

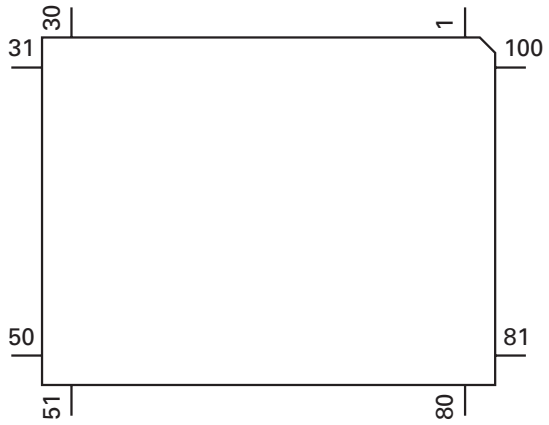
7.2.1 IC

● **Pin Functions (UPD63711GC)**

Pin No.	Pin Name	I/O	Function and Operation
1	D.GND		Logic circuit GND
2	RFOK	O	RFOK signal output
3	$\overline{\text{RST}}$	I	Reset signal input
4	A0	I	Command/parameter identification signal input
5	$\overline{\text{STB}}$	I	Data strobe signal input
6	$\overline{\text{SCK}}$	I	Clock signal input for serial data input/output
7	SO	O	Serial data and status signal output
8	SI	I	Serial data input
9	$\overline{\text{XTALEN}}$	I	Crystal oscillation control pin
10	D.VDD		Positive power supply terminal to logic circuit
11	DA.VDD		Positive power supply terminal to D/A converter
12	R_OUT	O	Right channel audio output signal
13	DA.GND		D/A converter GND
14	REGC	I	The outside putting capacitor connection pin for SCF regulator
15	DA.GND		D/A converter GND
16	L_OUT	O	Left channel audio output signal
17	DA.VDD		Positive power supply terminal to D/A converter
18	R+	O	Right channel audio data output
19	R-	O	Right channel audio data output
20	L-	O	Left channel audio data output
21	L+	O	Left channel audio data output
22	X.VDD		Positive power supply terminal to crystal oscillation circuit
23	XTAL	I	Crystal oscillator connect pin
24	$\overline{\text{XTAL}}$	O	Crystal oscillator connect pin
25	X.GND		Crystal oscillation circuit GND
26	D.VDD		Positive power supply terminal to logic circuit
27	EMPH	O	Output pin for the pre-emphasis data in the sub-Q code
28	FLAG	O	Flag output pin to indicate that audio data currently being output consists of noncorrectable data
29	DIN	I	Serial data input to internal DAC
30	DOUT	O	Serial audio data output
31	SCKIN	I	Serial clock input to internal DAC
32	SCKO	O	Audio data that is output from DOUT changes at rising edge of this clock
33	LRCKIN	I	LRCK signal input to internal DAC
34	LRCK	O	Signals to distinguish the right and left channels of the audio data output from DOUT
35	HOLD	O	Defect detection output
36	TX	O	Digital audio interface data output
37	D.GND		Logic circuit GND
38	C16M	O	Oscillator clock buffering output
39	LIMIT	I	Status of the pin is output at Bit 5 of the status output
40	D.VDD		Positive power supply terminal to logic circuit
41	LOCK	O	EFM synchronous detection signal
42	RFCK	O	Frame synchronous signal of XTAL-system
43	MIRR	O	MIRR output
44	PLCK	O	Monitor pin of bit clock
45	D.GND		Logic circuit GND
46	C1D1	O	Output pin for indicating the C1 error correction results
47	C1D2	O	Output pin for indicating the C1 error correction results
48	C2D1	O	Output pin for indicating the C2 error correction results
49	C2D2	O	Output pin for indicating the C2 error correction results
50	C2D3	O	Output pin for indicating the C2 error correction results
51	D.VDD		Positive power supply terminal to logic circuit
52	PACK	O	CD-TEXT PACK synchronous signal
53	TSO	O	CD-TEXT data serial output
54	TSI	I	CD-TEXT control parameter serial input
55	$\overline{\text{TSCK}}$	I	CD-TEXT serial clock input

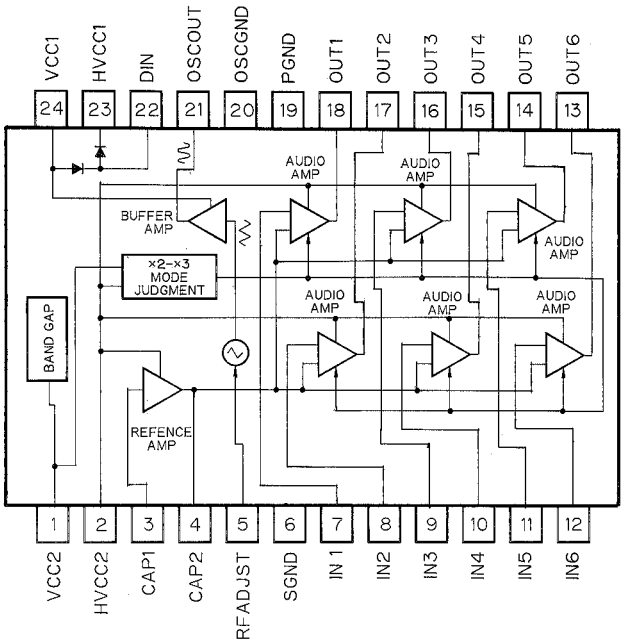
Pin No.	Pin Name	I/O	Function and Operation
56	TSTB	I	CD-TEXT parameter strobe signal input
57	D.GND		Logic circuit GND
58	TEST0	I	Test pin
59	TEST1	I	Test pin
60	ATEST	O	Test pin
61	A.GND		Analog circuit GND
62	FD	O	Focus drive output
63	TD	O	Tracking drive output
64	SD	O	Sled drive output
65	MD	O	Spindle drive output
66	DAC0	O	DAC output for adjustment
67	DAC1	O	DAC output for adjustment
68	DAC2	O	DAC output for adjustment
69	DAC3	O	DAC output for adjustment
70	A.VDD		Positive power supply terminal to analog circuit
71	EFM	O	EFM signal output
72	ASY	I	EFM comparator reference voltage input
73	C3T		3T detection capacitor additional pin
74	RFI	I	RF signal input for EFM data regulation
75	AGCO	O	RF signal output of after gain adjustment
76	AGCI	I	RF-AGC amplifier input
77	RFO	O	RF summing amplifier output
78	EQ2		RF amplifier equalizer parts additional pin
79	EQ1		RF amplifier equalizer parts additional pin
80	RF-	I	RF summing amplifier inverted input
81	A.GND		Analog circuit GND
82	A	I	Photo detector A input
83	C	I	Photo detector C input
84	B	I	Photo detector B input
85	D	I	Photo detector D input
86	F	I	Photo detector F input
87	E	I	Photo detector E input
88	A.VDD		Positive power supply terminal to analog circuit
89	REFOUT	O	Reference electric potential output
90	FE-	I	Focus error amplifier inverted input
91	FEO	O	Focus error amplifier output
92	TE-	I	Tracking error amplifier inverted input
93	TEO	O	Tracking error amplifier output
94	TE2	O	Tracking error output of after amplification
95	TEC	I	Tracking comparator input
96	A.GND		Analog circuit GND
97	PD	I	PD detection signal input for LD output monitor
98	LD	O	LD control current output
99	PN	I	APC circuit control polarity set pin
100	A.VDD		Positive power supply terminal to analog circuit

*UPD63711GC

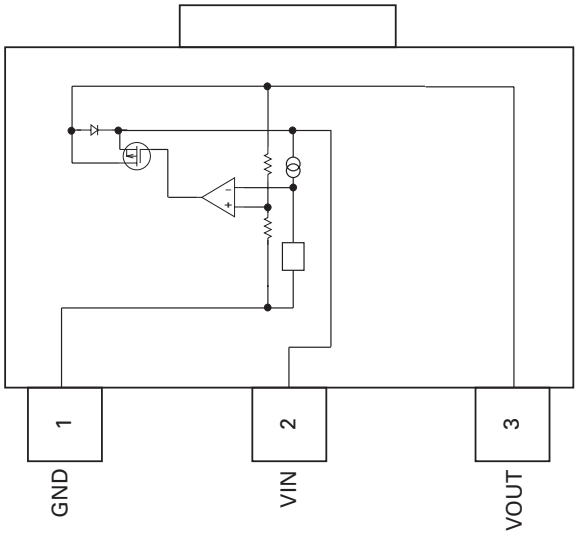


IC's marked by* are MOS type.
Be careful in handing them because they are very liable to be damaged by electrostatic induction.

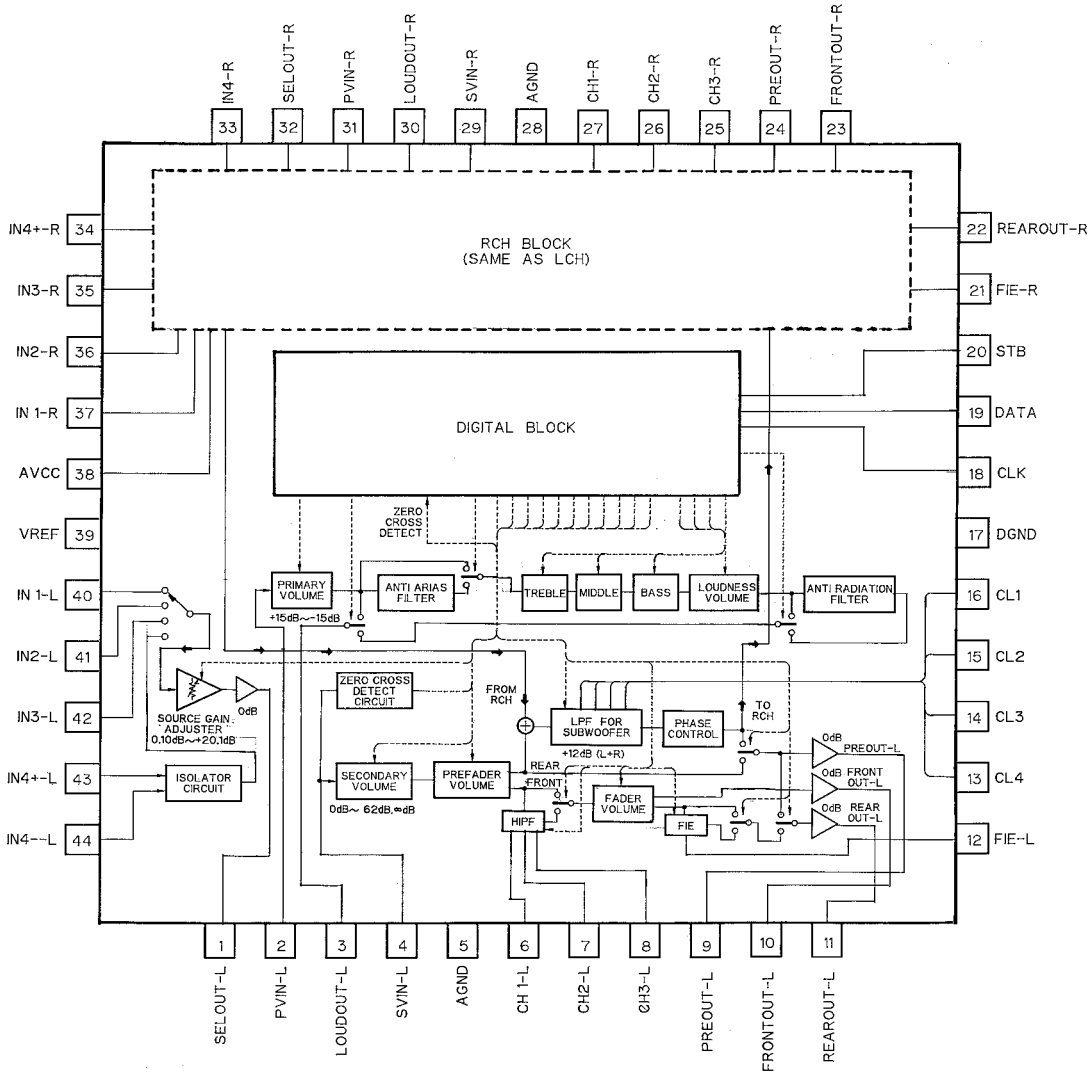
PA2028A



S-81250SGUP



PML004AF

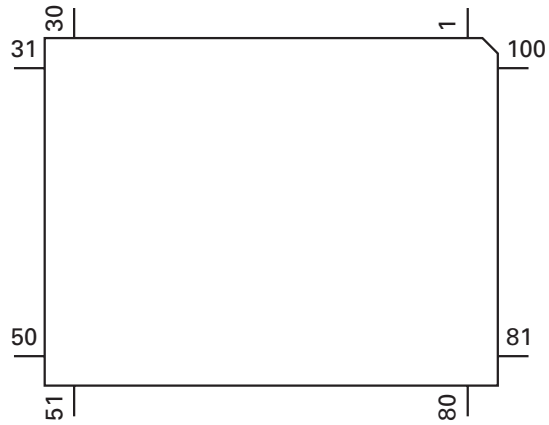


● **Pin Functions (PE5106B)**

Pin No.	Pin Name	I/O	Function and Operation
1	$\overline{\text{SWVDD}}$	O	Keyboard unit power supply control output
2	$\overline{\text{DSENS}}$	I	Grille detach sense input
3,4	NC		Not used
5	TESTIN	I	Test program mode input
6	NC		Not used
7	TELIN	I	Telephone mute input
8-10	NC		Not used
11	$\overline{\text{RESET}}$	I	Reset input
12	XT2		Not used (open)
13	XT1		Connect to VSS
14	VSS		GND
15	X2		Crystal oscillator connection pin
16	X1		Crystal oscillator connection pin
17	REGOFF		Connect to VSS
18	REGC		Connect to VSS
19	VDD		Power supply
20	ILMPW	O	Illumination power supply control output
21	SYSPW	O	System power control output
22	$\overline{\text{ADPW}}$	O	A/D converter power supply control output
23	LCDPW	O	LCD back light power supply control output
24	IPPW	O	Power supply control output for IP BUS interface IC
25	ASENBO	O	Slave power supply control output
26	ROMDATA	O	ROM collection data output
27	ROMCLK	O	ROM collection clock output
28	MUTE	O	System mute output
29	$\overline{\text{FM}}$/AM	O	RDS decoder power supply control output
30	LOCL	O	Local L output
31	LOCH	O	Local H output
32	$\overline{\text{TUNPCE2}}$	O	EEPROM chip enable output
33	VCK	O	Clock output for electronic volume
34	VST	O	Strobe pulse output for electronic volume
35	VDT	O	Data output for electronic volume
36	NC		Not used
37	ROMCS	O	ROM collection chip select output
38	SD	I	Station detector input
39	$\overline{\text{ST}}$	I	FM stereo input
40	VSS		GND
41	VDD		Power supply
42	DIM	O	DIMMER select output
43	$\overline{\text{CSENS}}$	I	Flap close sense input
44	NC		Not used
45	$\overline{\text{CURRQ}}$	O	Tuner voltage FIX output
46	NC		Not used
47	DRELAY	O	External relay control output
48	DRSENS	I	Door open/close sense input
49	DRSYS	O	Door system select output
50	$\overline{\text{DLED}}$	O	Alarm LED output
51	DLSENS	I	Door lock sense input
52	NC		Not used
53	$\overline{\text{MOSENS}}$	I	Motion/window damage sensor input
54	CD5VON	O	CD +5V power supply control output
55	CONT	O	CD servo driver power supply control output
56	VDCONT	O	CD VD power control output
57	CDMUTE	O	CD mute control output
58	CDEJET	O	CD load motor eject control output
59	CDLOAD	O	CD LOAD motor loading control output
60	LOCK	I	CD spindle lock detector input
61	FOK	I	CD focus OK signal input

Pin No.	Pin Name	I/O	Function and Operation
62	PCL	O	Clock adjustment output
63	MIRR	I	CD mirror detection input
64	$\overline{\text{CLAMP}}$	I	CD disc clamp input
65	$\overline{\text{XSCK}}$	O	CD LSI clock output
66	XSI	I	CD LSI data input
67	XSO	O	CD LSI data output
68	XA0	O	CD LSI command / data control output
69	$\overline{\text{XRST}}$	O	CD LSI reset control output
70	$\overline{\text{XSTB}}$	O	CD LSI strobe output
71,72	NC		Not used
73	TEST(GND)	I	GND
74	SL	I	Signal level input
75	$\overline{\text{EJECT}}$	I	Eject sense input
76	MODEL1	I	Model select input
77	FLPILM	I	Flap illumination input
78	EJTSNS	I	CD disc EJECT position detect input
79	DSCSNS	I	CD disc insert sense input
80	VDSENS	I	VD voltage sense input
81	TEMP	I	Temperature sense input (CD)
82	VDD		A/D converter power supply terminal
83	VDD		A/D converter reference voltage terminal
84	GND		GND
85	RX	I	IP BUS data input
86	TX	O	IP BUS data output
87	GND		GND
88	$\overline{\text{LDET}}$	I	PLL lock sense input
89,90	NC		Not used
91	$\overline{\text{ISENS}}$	I	Illumination sense input
92	$\overline{\text{ASENS}}$	I	ACC power sense input
93	$\overline{\text{BSENS}}$	I	Back up power sense input
94	TUNPDI	I	PLL IC data input
95	KYDT	I	Grille data input
96	DPDT	O	Grille data output
97	TUNPCK	O	PLL IC clock output
98	TUNPDO	O	PLL IC data output
99	TUNPCE	O	PLL IC chip enable output
100	PEE	O	Beep tone output

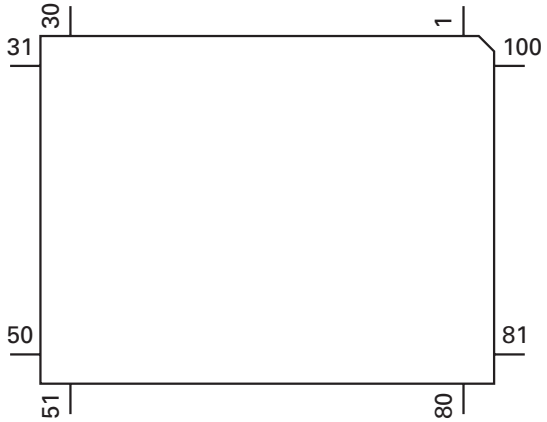
*PE5106B



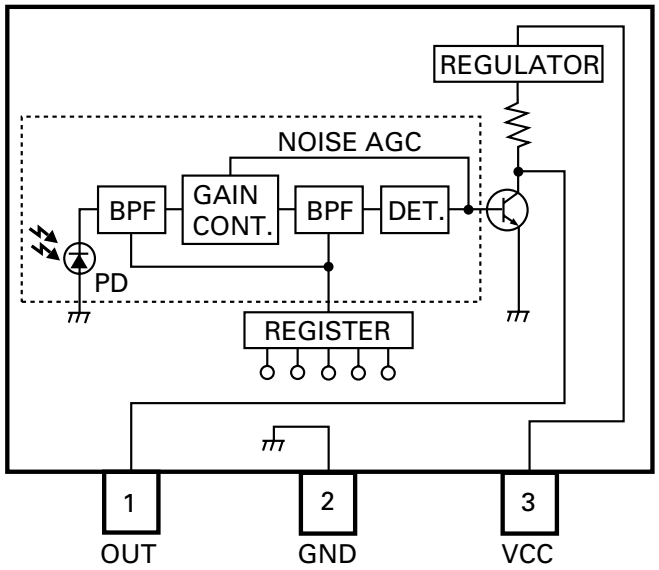
● **Pin Functions (PD6279A)**

Pin No.	Pin Name	I/O	Function and Operation
1–42	SEG41–0	O	LCD segment output
43–46	COM3–0	O	LCD common output
47–49	V1–V3		LCD bias power supply
50	VCC		Power supply terminal
51	LED	O	LED control output
52	SO	O	System micro computer UART communication data output
53	SI	I	System micro computer UART communication data input
54,55	MOD0,1		GND
56	RST	I	Reset signal input terminal
57	X0		Crystal oscillator connection pin
58	X1		Crystal oscillator connection pin
59	VSS		GND
60	REMIN	I	Remote control reception input
61	DIM	O	Dimmer select output
62	GRN/$\overline{\text{AMB}}$	O	Illumination color select output
63–66	KDT4–1	I	Key data input
67–72	KST6–1	O	Key strobe output
73–100	SEG69-42	O	LCD segment output

*PD6279A



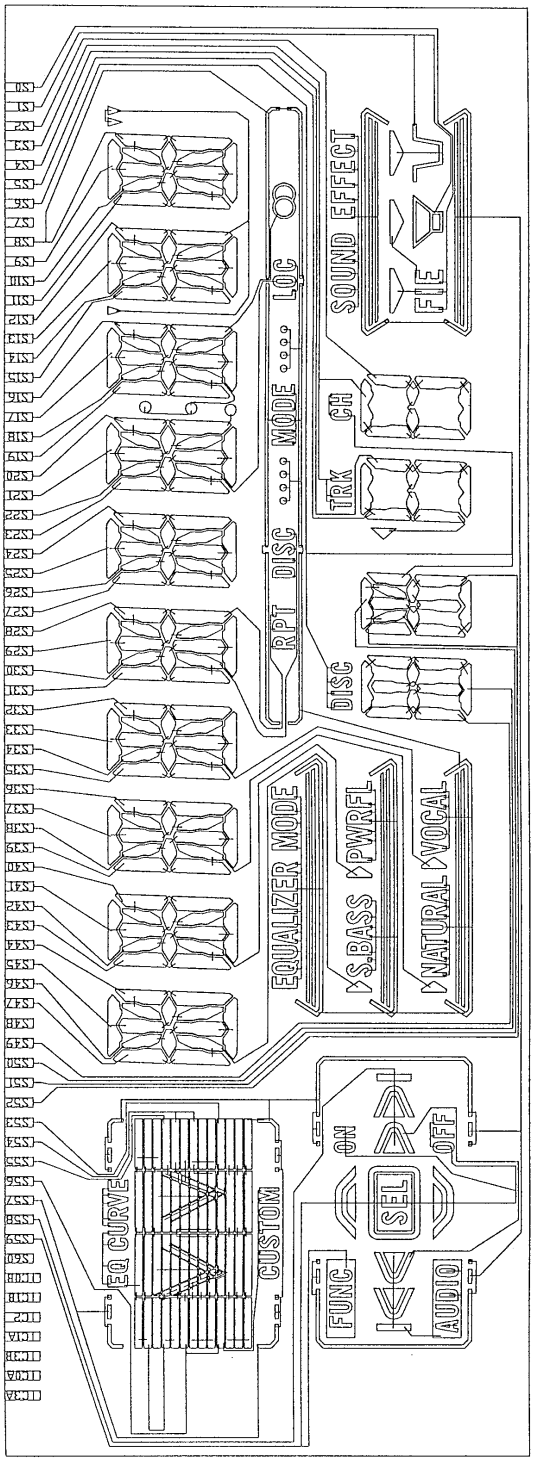
TSOP1840SB1



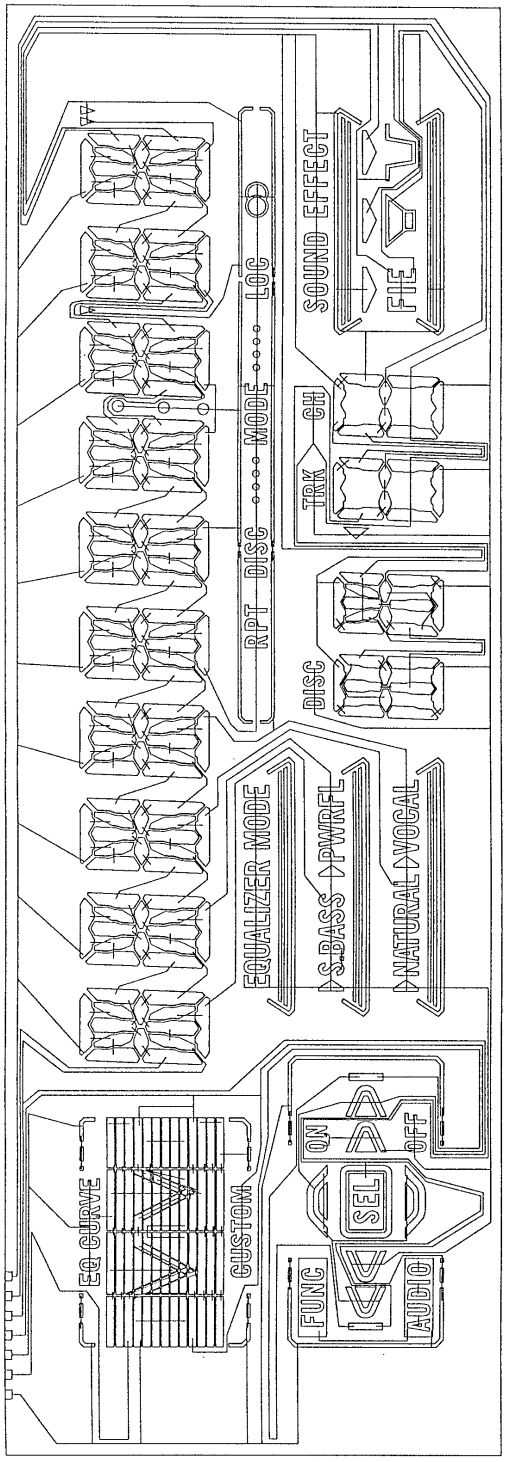
7.2.2 DISPLAY

● **CAW1565**

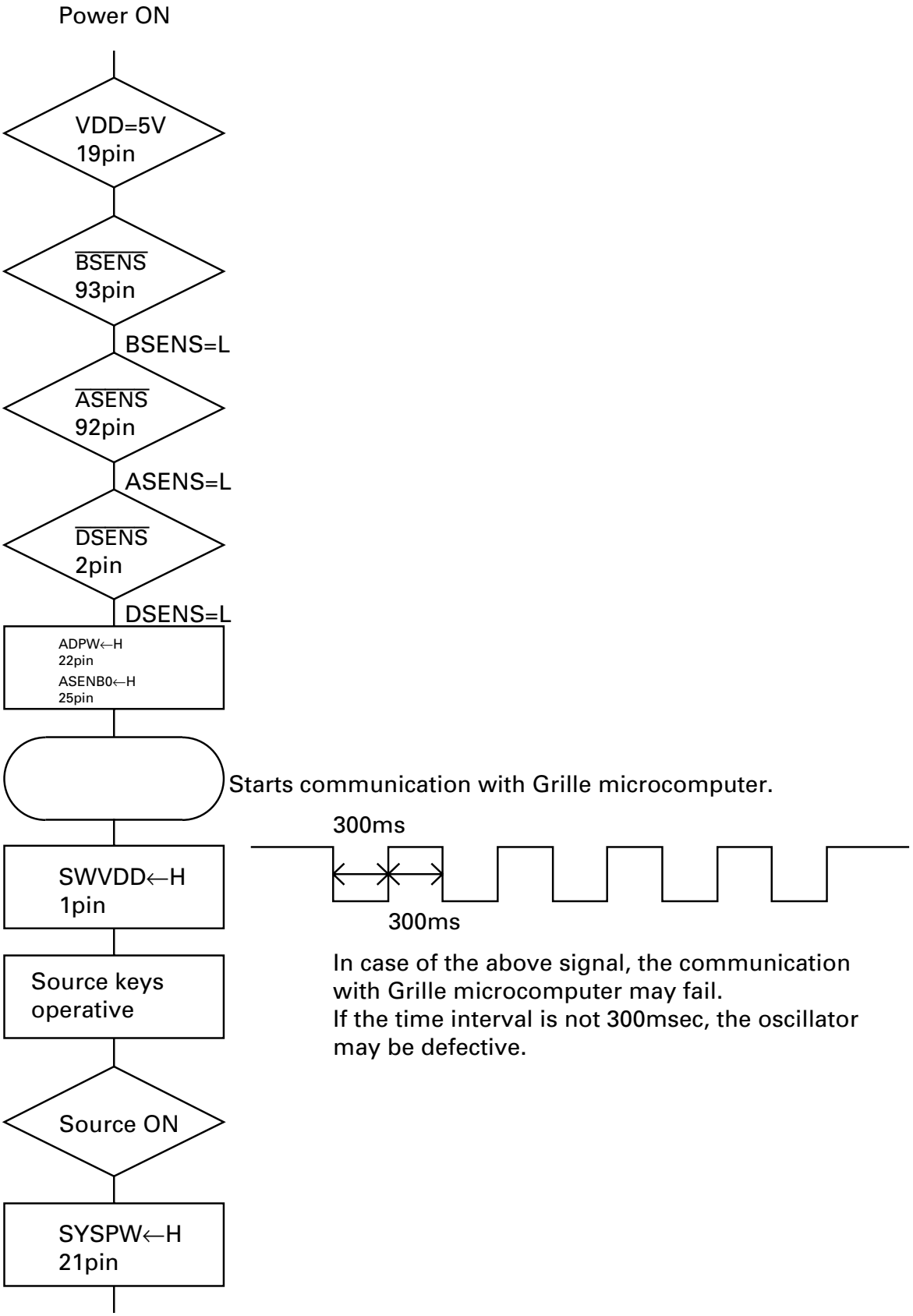
SEGMENT



COMMON



7.3 OPERATIONAL FLOW CHART

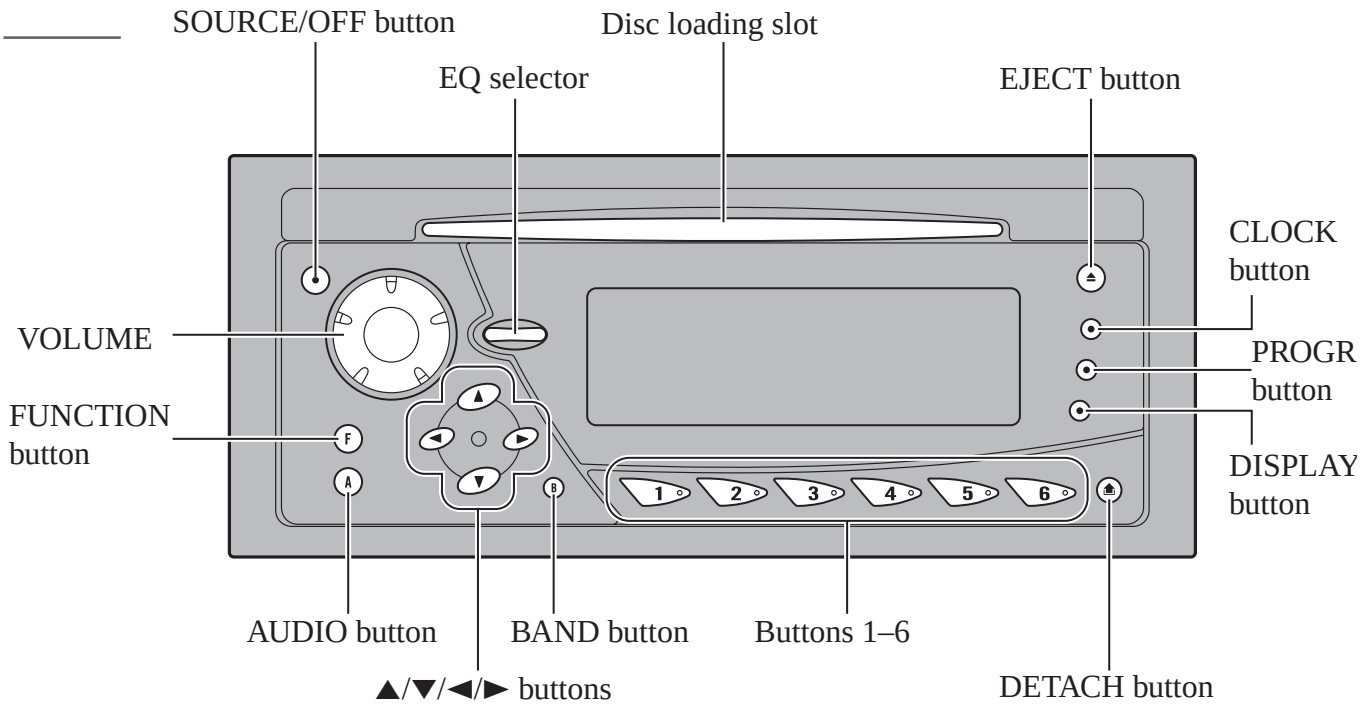


Completes power-on operation. (After that, proceed to each source operation.)

8. OPERATIONS AND SPECIFICATIONS

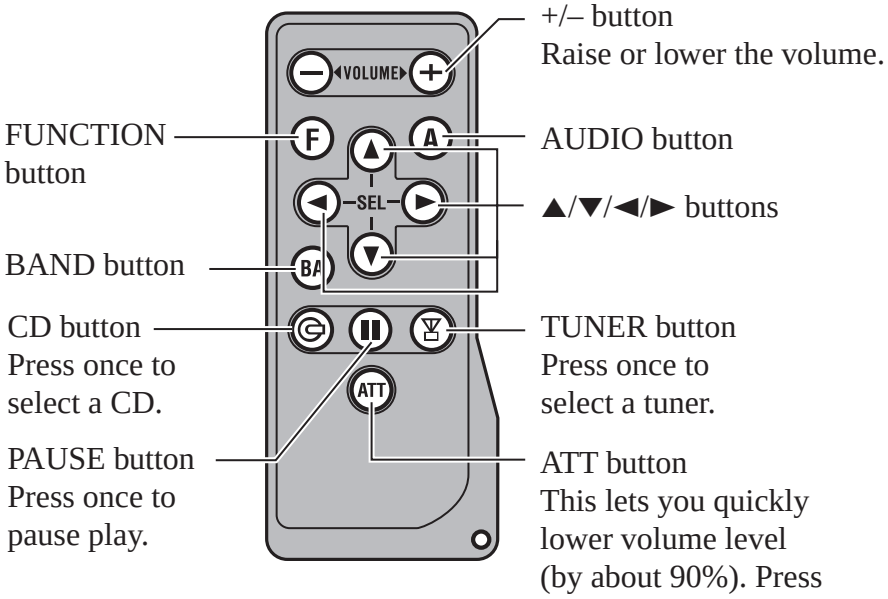
8.1 OPERATIONS

Head Unit



Remote Controller (DEH-P77DH/X1M/UC)

A remote controller that enables remote operation of the head unit is supplied.
Operation is the same as when using buttons on the head unit.

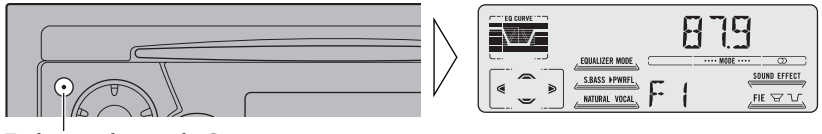


To Listen to Music

The following explains the initial operations required before you can listen to music.

Note:
- Loading a disc in this product.

1. Select the desired source. (e.g. Tuner)



Each press changes the Source ...

■ Head Unit

Each press of the SOURCE/OFF button selects the desired source in the following order:
Built-in CD player → TV → Tuner → Multi-CD player → External Unit → AUX

■ Remote Controller

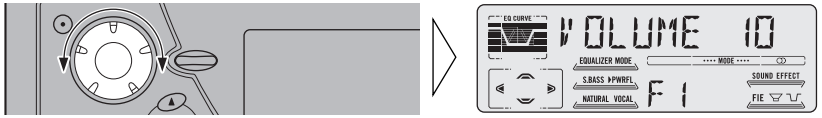
Each press of the button selects the desired source in the following order:
TUNER button : TV → Tuner → OFF
CD button : Built-in CD player → Multi-CD player → OFF

Note:
- External Unit refers to a Pioneer product (such as one available in the future) that, although incompatible as a source, enables control of basic functions by this product. Only one External Unit can be controlled by this product.
- In the following cases, the sound source will not change:
  * When a product corresponding to each source is not connected to this product.
  * When no disc is set in this product.
  * When no magazine is set in the Multi-CD player.
  * When the AUX (external input) is set to OFF.
- When this product's blue/white lead is connected to the car's Auto-antenna relay control terminal, the car's Auto-antenna extends when this product's source is switched ON. To retract the antenna, switch the source OFF.

2. Extend the VOLUME forward.

When you press the VOLUME, it extends forward so that it becomes easier to roll. To retract the VOLUME, press it again.

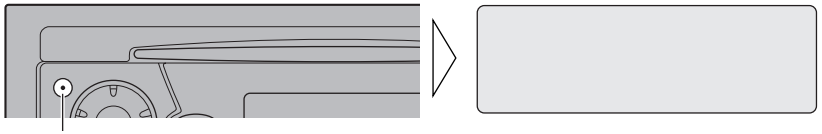
3. Raise or lower the volume.



Rolling the VOLUME changes the volume level.

Note:
- Roll clockwise to raise the volume level.
- Roll counterclockwise to lower the volume level.

4. Turn the source OFF.



Hold for 1 second

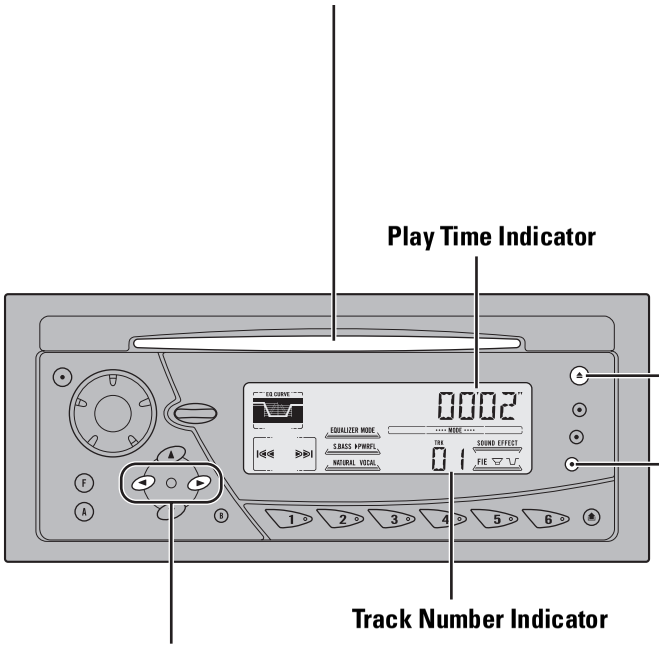
Basic Operation of Built-in CD Player

Disc Loading Slot

The Built-in CD player plays one standard 12 cm or 8 cm (single) CD at a time. Do not use an adapter when playing 8 cm CD.

Eject

Note:
- The CD function can be turned ON/OFF with the disc remaining in this product.
- Discs left partially inserted after ejection may incur damage or fall out.



Switching the Display

Each press of the DISPLAY button changes the display in the following order:
Playback mode (Elapsed play time)
→ Disc Title

Note:
- If you switch displays when disc titles have not been input, “NO TITLE” is displayed.

Track Search and Fast Forward/Reverse

- **You can select between Track Search or Fast Forward/Reverse by pressing the ◄/► button for a different length of time.**

Track Search	0.5 seconds or less
Fast Forward/Reverse	Continue pressing

Note:
- If a disc cannot be inserted fully or playback fails, make sure the recorded side is down. Press the EJECT button and check the disc for damage before reinserting it.
- If a CD is inserted with the recorded side up, it will be ejected automatically after a few moments.
- If the Built-in CD player cannot operate properly, an error message (such as “ERROR-14”) appears on the display.
- The Built-in CD player is not equipped with CD TEXT function.
- A CD TEXT disc is a CD featuring recorded text information such as Disc Title, Artist Name and Track Title.

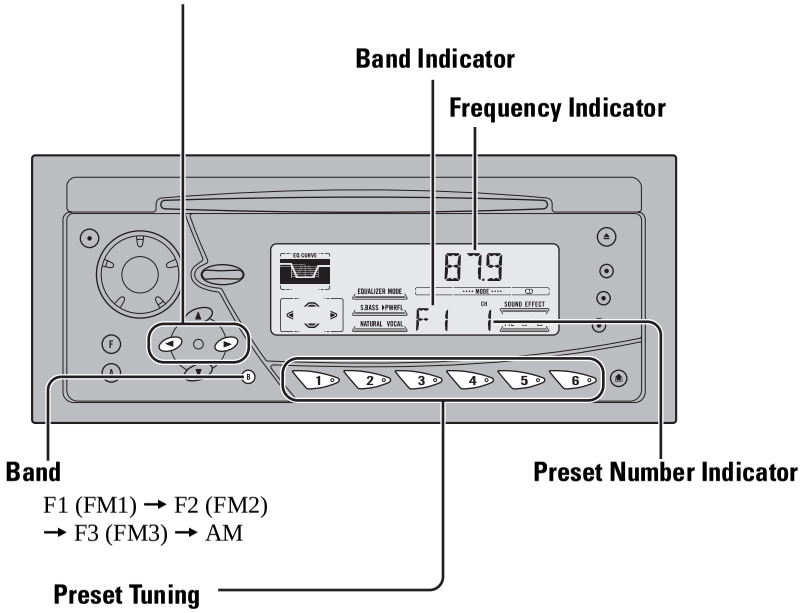
Basic Operation of Tuner

Manual and Seek Tuning

- **You can select the tuning method by changing the length of time you press the ◄/► button.**

Manual Tuning (step by step)	0.5 seconds or less
Seek Tuning	0.5 seconds or more

Note:
- If you continue pressing the button for longer than 0.5 seconds, you can skip broadcasting stations. Seek Tuning starts as soon as you release the button.
- Stereo indicator "◯◯" lights when a stereo station is selected.



- **You can memorize broadcast stations in buttons 1 through 6 for easy, one-touch station recall.**

Preset station recall	2 seconds or less
Broadcast station preset memory	2 seconds or more

Note:
- Up to 18 FM stations (6 in F1 (FM1), F2 (FM2) and F3 (FM3)) and 6 AM stations can be stored in memory.
- You can also use the ▲ or ▼ buttons to recall broadcast stations memorized in buttons 1 through 6.

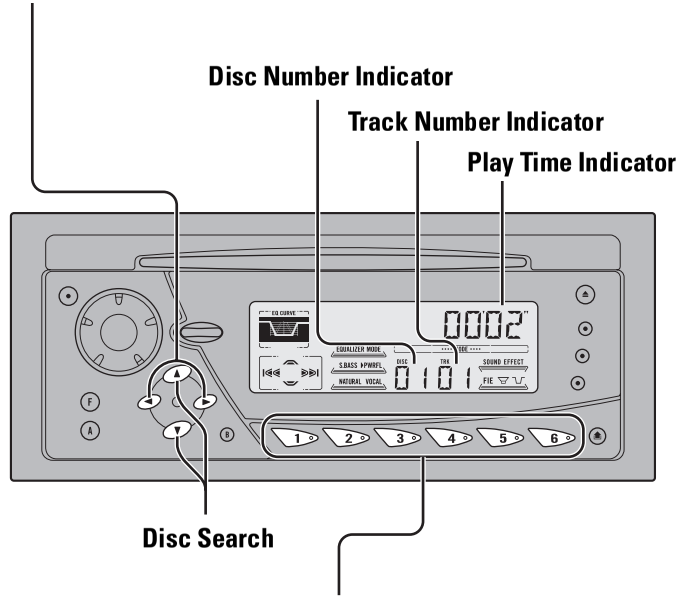
Basic Operation of Multi-CD Player

This product can control a Multi-CD player (sold separately).

Track Search and Fast Forward/Reverse

- **You can select between Track Search or Fast Forward/Reverse by pressing the ◄/► button for a different length of time.**

Track Search	0.5 seconds or less
Fast Forward/Reverse	Continue pressing



Disc Number Search (for 6-Disc, 12-Disc types)

- **You can select discs directly with the 1 to 6 buttons. Just press the number corresponding to the disc you want to listen to.**

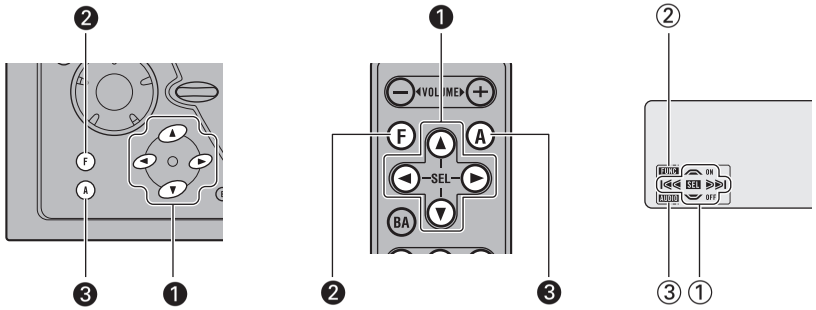
Note:
- When a 12-Disc Multi-CD Player is connected and you want to select disc 7 to 12, press the 1 to 6 buttons for 2 seconds.

Note:
- The Multi-CD player may perform a preparatory operation, such as verifying the presence of a disc or reading disc information, when the power is turned ON or a new disc is selected for playback. "READY" is displayed.
- If the Multi-CD player cannot operate properly, an error message such as "ERROR-14" is displayed. Refer to the Multi-CD player owner's manual.
- If there are no discs in the Multi-CD player magazine, "NO DISC" is displayed.

Corresponding Display Indications and Buttons

This product's display features Key Guidance Indicators. These light to indicate which of the ▲/▼/◄/►, FUNCTION and AUDIO buttons you can use. When you're in the Function Menu (refer to next section), Detailed Setting Menu, Initial Setting Menu or Audio Menu, they also make it easy to see which ▲/▼/◄/► buttons you can use to switch functions ON/OFF, switch repeat selections and perform other operations.
Indicator and corresponding buttons are shown below.

■ Head Unit ■ Remote Controller ■ Display



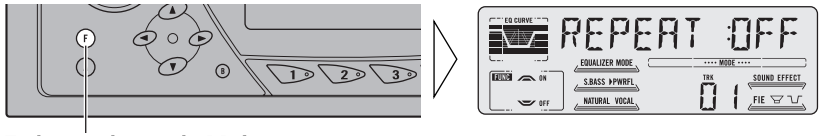
When ① is lit in the display, perform appropriate operations with the ❶ buttons.
When ② is lit in the display, it indicates that you are in the Function Menu, Detailed Setting Menu or Initial Setting Menu. You can switch between each of these menus and between different modes in the menus using button ❷ on the head unit or remote controller.
When ③ is lit in the display, it indicates you are in the Audio Menu. You can switch between modes in the Audio Menu using button ❸ on the head unit or remote controller.

Entering the Function Menu

The Function Menu lets you operate simple functions for each source.

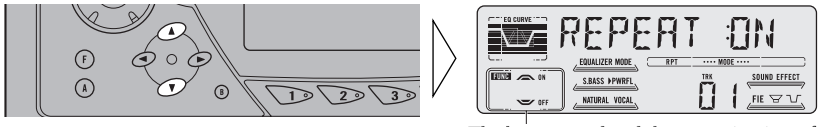
Note:
- After entering the Function Menu, if you do not perform an operation within about 30 seconds, the Function Menu is automatically canceled.

1. Select the desired mode in the Function Menu. (Refer to next section, "Function Menu Functions".)



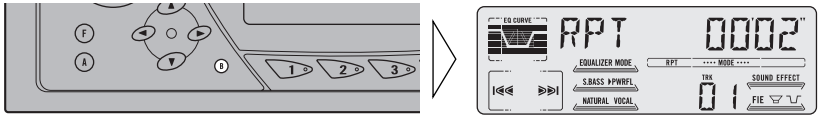
Each press changes the Mode ...

2. Operate a mode. (e.g. Repeat Play)



The button used and the operation it performs are indicated by the key guidance indicator. Press the ▲ button to switch the key guidance indicator ON, and the ▼ button to switch it OFF.

3. Cancel the Function Menu.



Function Menu Functions

The following chart shows functions for each source in the Function Menu. The chart also shows indications for each function, operations and buttons used to perform operations.
For more details, or when you want to know about an operation.

■ Tuner

Function name (Display)	Button: Operation
Best Stations Memory (BSM)	▲: ON ▼: OFF
Local Seek Tuning (LOCAL)	1 ▲: ON ▼: OFF 2 ◄ or ►: Select (Sensitivity)

■ Built-in CD Player

Function name (Display)	Button: Operation
Repeat Play (REPEAT)	▲: ON ▼: OFF
Random Play (RANDOM)	▲: ON ▼: OFF
Scan Play (T-SCAN)	▲: ON ▼: OFF
Pause (PAUSE)	▲: ON ▼: OFF

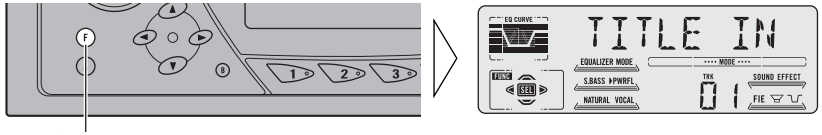
■ **Multi-CD Player**

Function name (Display)	Button: Operation
Repeat Play (REPEAT)	◄ or ►: Select (Play range)
Selecting Discs by Disc Title List (TITLE LIST)	1 ◄ or ►: Select (Disc Title) 2 ▲: Play
Random Play (RANDOM)	▲: ON ▼: OFF
Scan Play (SCAN)	▲: ON ▼: OFF
ITS Play (ITS-P)	▲: ON ▼: OFF
Pause (PAUSE)	▲: ON ▼: OFF
Compression and DBE (COMP)	▲ or ▼: Select (Sound Quality Function)

Entering the Detailed Setting Menu

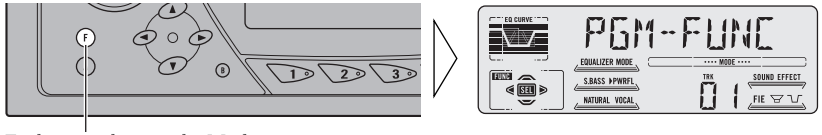
In the Detailed Setting Menu, you can operate convenient, complex functions for each source.

1. Enter the Detailed Setting Menu.



Hold for 2 seconds

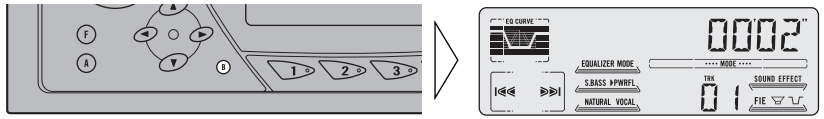
2. Select the desired mode. (Refer to next section, “Detailed Setting Menu Functions”.)



Each press changes the Mode ...

3. Operate a mode.

4. Cancel the Detailed Setting Menu.



Note:

- You can cancel the Detailed Setting Menu by pressing the FUNCTION button again for 2 seconds.

Detailed Setting Menu Functions

The following chart shows functions for each source in the Detailed Setting Menu. The chart also shows indications for each function, operations and buttons used to perform operations. For more details, or when you want to know about an operation.

■ **Tuner**

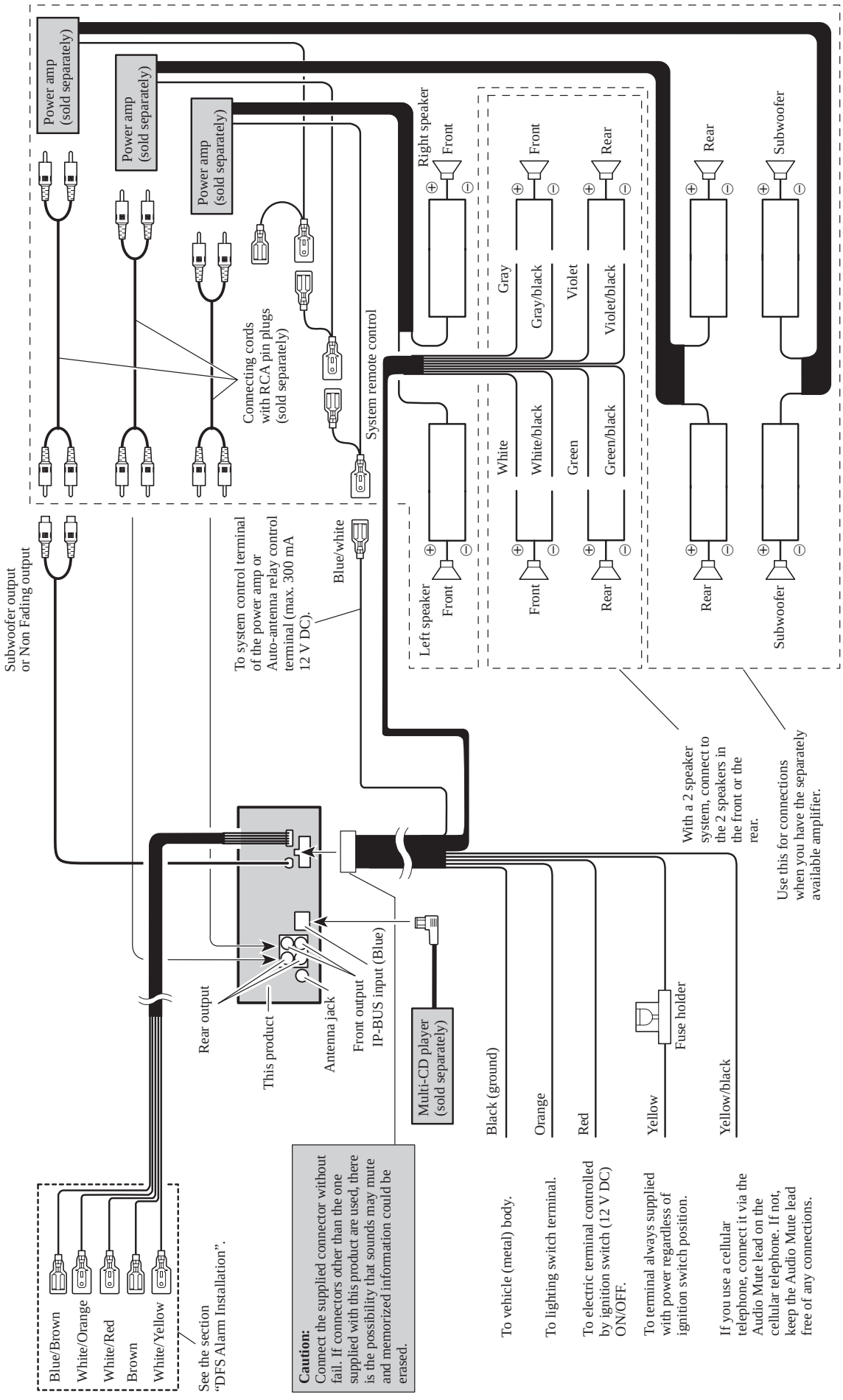
Function name (Display)	Button: Operation
Program Function (PGM-FUNC)	1 ◄ or ►: Select (Function) 2 ▲: Memory

■ **Built-in CD Player**

Function name (Display)	Button: Operation
Disc Title Input (TITLE IN)	1 ▲ or ▼: Select (Letter) 2 ◄ or ►: Select (Position) 3 ►: Memory
Program Function (PGM-FUNC)	1 ◄ or ►: Select (Function) 2 ▲: Memory

■ **Multi-CD Player**

Function name (Display)	Button: Operation
Disc Title Input (TITLE IN)	1 ▲ or ▼: Select (Letter) 2 ◄ or ►: Select (Position) 3 ►: Memory
ITS Programming (ITS)	▲: Memory
Program Function (PGM-FUNC)	1 ◄ or ►: Select (Function) 2 ▲: Memory


Power amp (sold separately)
Power amp (sold separately)
Power amp (sold separately)
Connecting cords with RCA pin plugs (sold separately)
System remote control
Right speaker
Front
Gray
Gray/black
Front
Violet
Violet/black
Rear
White
White/black
Front
Green
Green/black
Rear
Left speaker
Front
Rear
Subwoofer
Subwoofer output or Non Fading output
To system control terminal of the power amp or Auto-antenna relay control terminal (max. 300 mA 12 V DC).
Blue/white
Rear output
This product
Antenna jack
Front output
IP-BUS input (Blue)
Multi-CD player (sold separately)
With a 2 speaker system, connect to the 2 speakers in the front or the rear.
Use this for connections when you have the separately available amplifier.
Black (ground)
Orange
Red
Yellow
Fuse holder
Yellow/black
To vehicle (metal) body.
To lighting switch terminal.
To electric terminal controlled by ignition switch (12 V DC) ON/OFF.
To terminal always supplied with power regardless of ignition switch position.
If you use a cellular telephone, connect it via the Audio Mute lead on the cellular telephone. If not, keep the Audio Mute lead free of any connections.
Blue/Brown
White/Orange
White/Red
Brown
White/Yellow
See the section "DFS Alarm Installation".
Caution:
Connect the supplied connector without fail. If connectors other than the one supplied with this product are used, there is the possibility that sounds may mute and memorized information could be erased.

8.2 SPECIFICATIONS

● DEH-P77DH/X1M/UC

General

Power source ..... 14.4 V DC (10.8 – 15.1 V allowable)
Grounding system ..... Negative type
Max. current consumption ..... 10.0 A
Dimensions
(chassis) ..... 198 (W) × 78 (H) × 135 (D) mm
[7-3/4 (W) × 3-1/8 (H) × 5-3/8 (D) in]
(nose) ..... 190 (W) × 74 (H) × 23 (D) mm
[7-1/2 (W) × 2-7/8 (H) × 7/8 (D) in]
Weight ..... 1.9 kg (4.2 lbs)

Amplifier

Continuous power output is 22 W per channel min. into 4 ohms, both channels driven 50 to 15,000 Hz with no more than 5% THD.
Maximum power output ..... 45 W × 4
45 W × 2 ch/4 Ω + 70 W × 1 ch/2 Ω (for Subwoofer)
Load impedance
..... 4 Ω (4 – 8 Ω [2 Ω for 1 ch] allowable)
Preout maximum output level/
output impedance ..... 4.0 V /100 Ω
Equalizer (3-Band Parametric Equalizer)
(Low) ..... Frequency: 40/80/100/160 Hz
Q Factor: 0.35/0.59/0.95/1.15
(+6 dB when boosted)
Gain: ±12 dB
(Mid) ..... Frequency: 200/500/1k/2k Hz
Q Factor: 0.35/0.59/0.95/1.15
(+6 dB when boosted)
Gain: ±12 dB
(High) ..... Frequency: 3.15k/8k/10k/12.5k Hz
Q Factor: 0.35/0.59/0.95/1.15
(+6 dB when boosted)
Gain: ±12 dB
Loudness contour
(Low) ..... +3.5 dB (100 Hz), +3 dB (10 kHz)
(Mid) ..... +10 dB (100 Hz), +6.5 dB (10 kHz)
(High) ..... +11 dB (100 Hz), +11 dB (10 kHz)
(volume: –30 dB)
Network
HPF
Frequency ..... 50/80/125 Hz
Slope ..... –12 dB/oct.
Subwoofer output
Frequency ..... 50/80/125 Hz
Slope ..... –18 dB/oct.
Gain ..... ±12 dB

CD player

System ..... Compact disc audio system
Usable discs ..... Compact disc
Signal format ..... Sampling frequency: 44.1 kHz
Number of quantizatin bits: 16; linear
Frequency characteristics ..... 5 – 20,000 Hz (±1 dB)
Signal-to-noise ratio ..... 94 dB (1 kHz) (IHF-A network)
Dynamic range ..... 92 dB (1 kHz)
Number of channels ..... 2 (stereo)

FM tuner

Frequency range ..... 87.9 – 107.9 MHz
Usable sensitivity ..... 10 dBf
(0.9 µV/75 Ω, mono, S/N: 30 dB)
50 dB quieting sensitivity ..... 15 dBf
(1.5 µV/75 Ω, mono)
Signal-to-noise ratio ..... 70 dB (IHF-A network)
Distortion ..... 0.3% (at 65 dBf, 1 kHz, stereo)
Frequency response ..... 30 – 15,000 Hz (±3 dB)
Stereo separation ..... 40 dB (at 65 dBf, 1 kHz)
Selectivity ..... 70 dB (2ACA)
Three-signal intermodulation
(desired signal level) ..... 30 dBf
(two undesired signal level: 100 dBf)

AM tuner

Frequency range ..... 530 – 1,710 kHz (10 kHz)
Usable sensitivity ..... 18 µV (S/N: 20 dB)
Selectivity ..... 50 dB (±10 kHz)

Note:

- Specifications and the design are subject to possible modification without notice due to improvements.

● DEH-P47DH/X1M/UC

General

Power source ..... 14.4 V DC (10.8 – 15.1 V allowable)
Grounding system ..... Negative type
Max. current consumption ..... 10.0 A
Dimensions
(chassis) ..... 198 (W) × 78 (H) × 135 (D) mm
[7-3/4 (W) × 3-1/8 (H) × 5-3/8 (D) in]
(nose) ..... 190 (W) × 74 (H) × 23 (D) mm
[7-1/2 (W) × 2-7/8 (H) × 7/8 (D) in]
Weight ..... 1.9 kg (4.2 lbs)

Amplifier

Continuous power output is 22 W per channel min. into 4 ohms, both channels driven 50 to 15,000 Hz with no more than 5% THD.
Maximum power output ..... 45 W × 4
45 W × 2 ch/4 Ω + 70 W × 1 ch/2 Ω (for Subwoofer)
Load impedance
..... 4 Ω (4 – 8 Ω [2 Ω for 1 ch] allowable)
Preout maximum output level/
output impedance ..... 2.2 V /1 kΩ
Equalizer (3-Band Parametric Equalizer)
(Low) ..... Frequency: 40/80/100/160 Hz
Q Factor: 0.35/0.59/0.95/1.15
(+6 dB when boosted)
Gain: ±12 dB
(Mid) ..... Frequency: 200/500/1k/2k Hz
Q Factor: 0.35/0.59/0.95/1.15
(+6 dB when boosted)
Gain: ±12 dB
(High) ..... Frequency: 3.15k/8k/10k/12.5k Hz
Q Factor: 0.35/0.59/0.95/1.15
(+6 dB when boosted)
Gain: ±12 dB
Loudness contour
(Low) ..... +3.5 dB (100 Hz), +3 dB (10 kHz)
(Mid) ..... +10 dB (100 Hz), +6.5 dB (10 kHz)
(High) ..... +11 dB (100 Hz), +11 dB (10 kHz)
(volume: –30 dB)
Network
HPF
Frequency ..... 50/80/125 Hz
Slope ..... –12 dB/oct.
Subwoofer output
Frequency ..... 50/80/125 Hz
Slope ..... –18 dB/oct.
Gain ..... ±12 dB

CD player

System ..... Compact disc audio system
Usable discs ..... Compact disc
Signal format ..... Sampling frequency: 44.1 kHz
Number of quantizatin bits: 16; linear
Frequency characteristics ..... 5 – 20,000 Hz (±1 dB)
Signal-to-noise ratio ..... 94 dB (1 kHz) (IHF-A network)
Dynamic range ..... 92 dB (1 kHz)
Number of channels ..... 2 (stereo)

FM tuner

Frequency range ..... 87.9 – 107.9 MHz
Usable sensitivity ..... 10 dBf
(0.9 µV/75 Ω, mono, S/N: 30 dB)
50 dB quieting sensitivity ..... 15 dBf
(1.5 µV/75 Ω, mono)
Signal-to-noise ratio ..... 70 dB (IHF-A network)
Distortion ..... 0.3% (at 65 dBf, 1 kHz, stereo)
Frequency response ..... 30 – 15,000 Hz (±3 dB)
Stereo separation ..... 40 dB (at 65 dBf, 1 kHz)
Selectivity ..... 70 dB (2ACA)
Three-signal intermodulation
(desired signal level) ..... 30 dBf
(two undesired signal level: 100 dBf)

AM tuner

Frequency range ..... 530 – 1,710 kHz (10 kHz)
Usable sensitivity ..... 18 µV (S/N: 20 dB)
Selectivity ..... 50 dB (±10 kHz)

Note:

- Specifications and the design are subject to possible modification without notice due to improvements.

Service Manual

ORDER NO.
CRT2423

CD MECHANISM MODULE

CX-958

- **This service manual describes the operation of the CD mechanism incorporated in models listed in the table below.**
- **When performing repairs use this manual together with the specific manual for model under repair.**

Model No.	Order No.	CD Mechanism Module	Mechanism Unit
DEH-P410/X1N/UC DEH-P4100/X1N/UC DEH-P310/X1N/UC	CRT2414	CXK5201	CXB4800
DEH-P41/X1N/UC DEH-P3100/X1N/UC	CRT2415	CXK5201	CXB4800
DEH-P4150/X1N/ES DEH-P3150/X1N/ES	CRT2416	CXK5201	CXB4800
DEH-P4100R/X1N/EW DEH-3110/X1N/EE	CRT2417	CXK5201	CXB4800
DEH-3130R/X1N/EW DEH-3100R-B/X1N/EW DEH-3100R/X1N/EW	CRT2418	CXK5201	CXB4800

CONTENTS

PIONEER CORPORATION 4-1, Meguro 1-Chome, Meguro-ku, Tokyo 153-8654, Japan
PIONEER ELECTRONICS SERVICE INC. P.O.Box 1760, Long Beach, CA 90801-1760 U.S.A.
PIONEER ELECTRONIC [EUROPE] N.V. Haven 1087 Keetberglaan 1, 9120 Melsele, Belgium
PIONEER ELECTRONICS ASIACENTRE PTE.LTD. 253 Alexandra Road, #04-01, Singapore 159936

K-ZZA. OCT. 1999 Printed in Japan

1. CIRCUIT DESCRIPTIONS

The LSI (UPD63711GC) used on this unit comprises six main blocks ; the pre-amp section, servo, signal processor, DAC, CD text decoder (not used on this model) and LPF. It also equips with nine automatic adjustment functions.

1.1 PRE-AMP SECTION

This section processes the pickup output signals to create the signals for the servo, demodulator and control.

The pickup output signals are I-V converted by the pre-amp with the built-in photo-detector in the pickup, then added by the RF amp to obtain RF, FE, TE, TE zero cross and other signals.

This pre-amp section is built in the servo LSI UPD63711GC (IC201). The following describes function of each section.

Since this system has a single power supply (+5V), the reference voltage for this LSI and pickup are set to REFO (2.5V). The REFO is obtained by passing the REFOUT from the LSI through the buffer amplifier. The REFO is output from Pin 89 of this LSI. All measurements are done using this REFO as reference.

Note : During the measurement, do not try to short the REFO and GND.

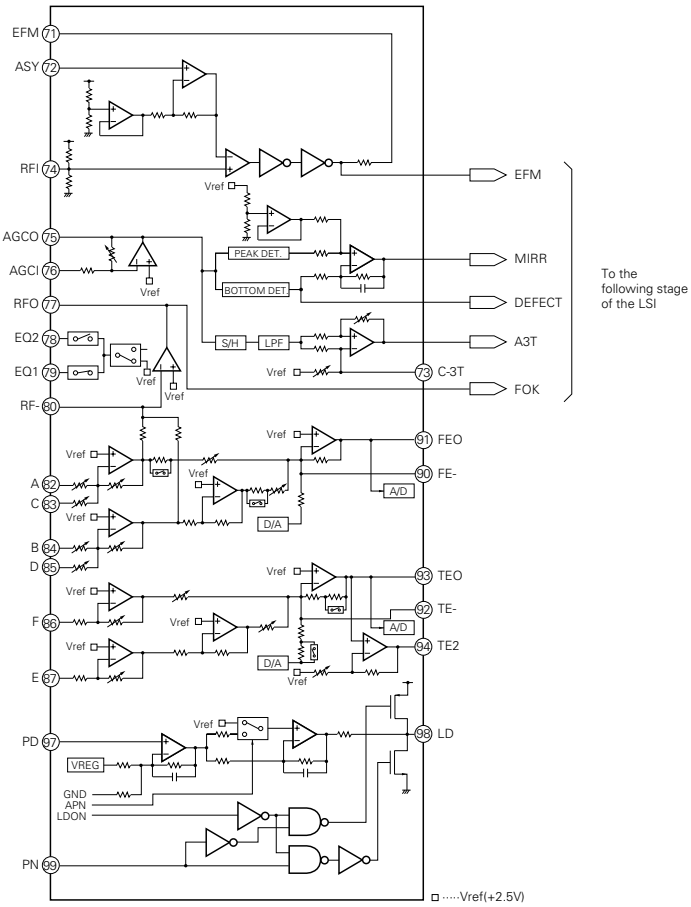


Fig.1 : BLOCK DIAGRAM OF BUILT-IN RF AMPLIFIER

1) APC Circuit (Automatic Power Control)

When the laser diode is driven with constant current, the optical output has large negative temperature characteristics. Thus, the current must be controlled from the monitor diode so that the output may be constant. APC circuit is for it. The LD current is obtained by measuring the voltage between LD1 and V+5. The value of this current is about 35mA.

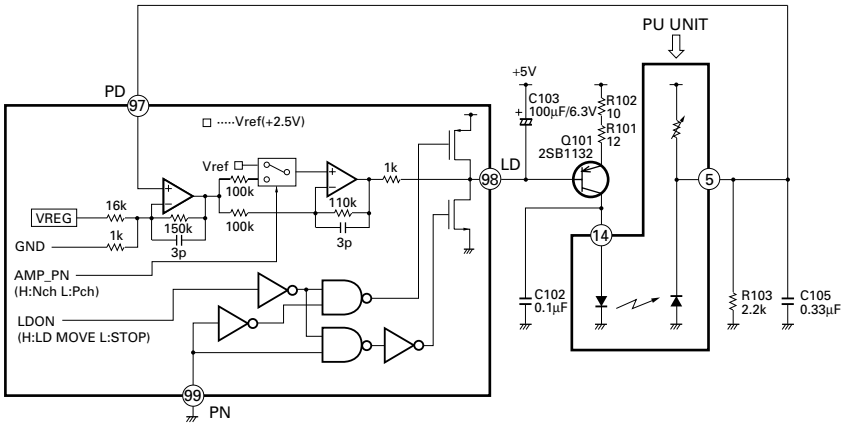


Fig.2 : APC CIRCUIT

2) RF Amplifier and RFAGC Amplifier

The photo-detector outputs (A + C) and (B + D) are added, amplified and equalized on this LSI and then output to the RFI terminal as the RF signal. (The eye pattern can be checked by this signal.)

The RFI voltage low frequency component is :

$$RFI = (A + B + C + D) \times 3.2$$

RFI is used on the FOK generator circuit and RF offset adjusting circuit.

R207 is an offset resistor for maintaining the bottom reference voltage of the RFI signal at 1.5 VDC. The D/A output used for the RF offset adjustment (to be described later) is entered via this resistor.

After the RFI signal from Pin 77 is externally AC coupled, entered to Pin 76 again, then amplified on the RFAGC amplifier to obtain the RFO signal.

The RFAGC adjustment function (to be described later) built-in the LSI is used for switching feedback gain of the RFAGC amplifier so that the RFO output may go to 1.5 ± 0.3Vpp.

The RFO signal is used for the EFM, DFCT, MIRR and RFAGC adjustment circuits.

3) RFOK Circuit

This circuit generates the signal that is used for indicating the timing of closing the focus or state of the focus close currently being played. This signal is output from Pin 4 as the FOK signal. It goes high when the focus close and in-play.

The RFOK signal is generated by holding DC level of the RFI at its peak with the succeeding digital section, then comparing it at a specific threshold level. Thus, the RFOK signal goes high even if the pit is absent. It indicates that the focus close can take place on the disc mirror surface, too.

This signal is also supplied to the micro computer via the low pass filter as the FOK signal and used for the protection and the RF amplifier gain switching.

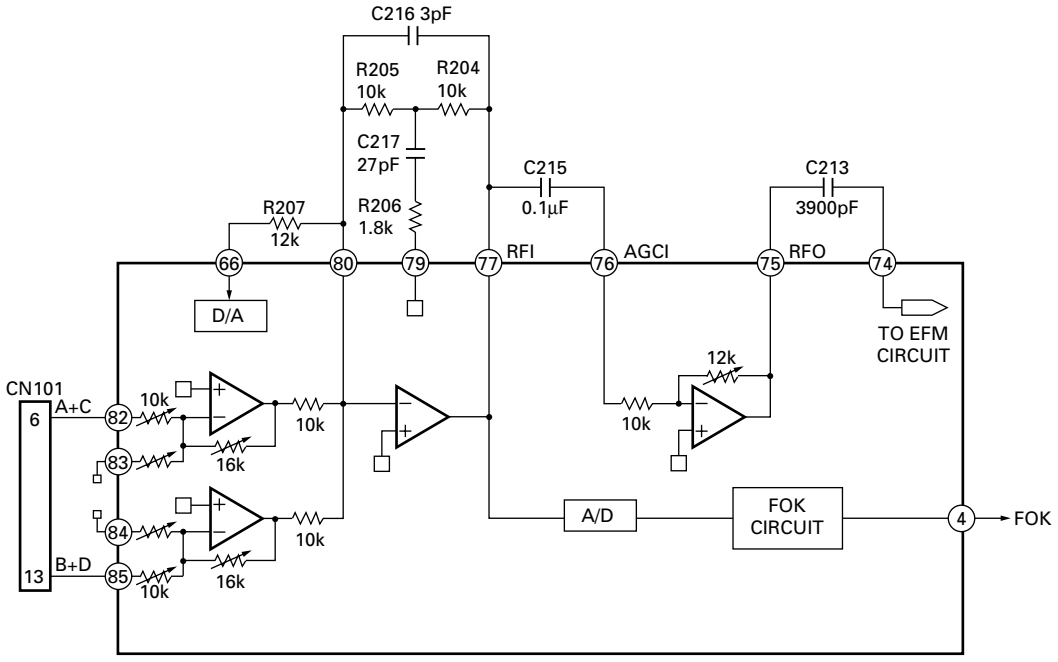


Fig.3 : RFAMP, RFAGC AND FOK CIRCUIT

4) Focus Error Amplifier

The photo-detector outputs (A + C) and (B + D) are passed through a differential amplifier and an error amplifier, and then (A + C – B – D) is output from Pin 91 as the FE signal. The FE voltage low frequency component is :

$$FE = (A + C - B - D) \times \frac{16k}{10k} \times \frac{80k}{(20k + 5k)}$$

$$= (A + C - B - D) \times 5$$

Using REFO as the reference, an S-curve of approximately 1.5 Vpp is obtained for the FE output. The final-stage amplifier cutoff frequency is 11.4 kHz.

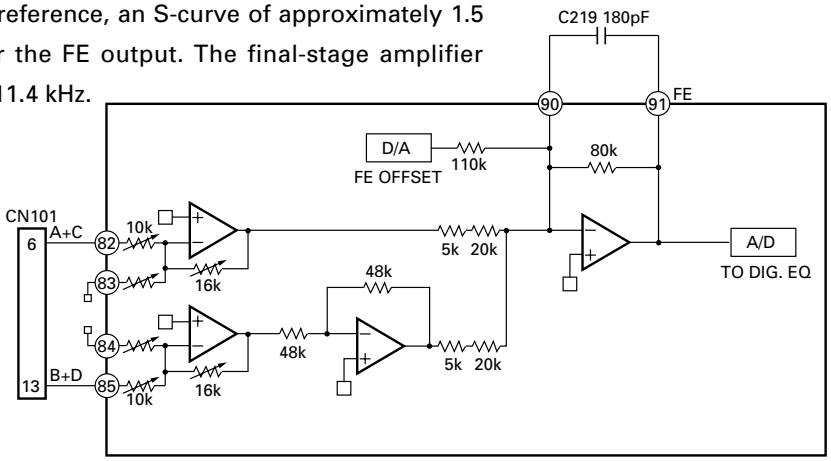


Fig.4 : FOCUS ERROR AMPLIFIER

5) Tracking Error Amplifier

The photo-detector outputs E and F are passed through a differential amplifier and an error amplifier, and then (E – F) is output from Pin 93 as the TE signal. The TE voltage low frequency component is :

$$TE = (E - F) \times \frac{224k}{112k} \times \frac{160k}{48.7k}$$

$$= (E - F) \times 6.6 \text{ (Effective LSI output is 5.0).}$$

Using REFO as the reference, the TE waveform of approximately 1.3 Vpp is obtained for the TE output. The final-stage amplifier cutoff frequency is 20 kHz.

6) Tracking Zero Crossing Amplifier

TEC signal (the tracking zero crossing signal) is obtained by multiplying the TE signal four times. It is used for locating the zero crossing points of the tracking error. The zero cross point detection is done for the following two reasons :

① To count tracks for carriage moves and track jumps.

② To detect the direction in which the lens is moving when the tracking is closed (it is used on the tracking brake circuit to be described later).

The TEC signal frequency range is 300 Hz to 20 kHz.

TEC voltage = TE level × 4

Theoretical TEC level is 5.2V. The signal exceeds D-range of the operational amplifier and thus is clipped. It, however, can be ignored since this signal is used by the servo LSI only at the zero crossing point.

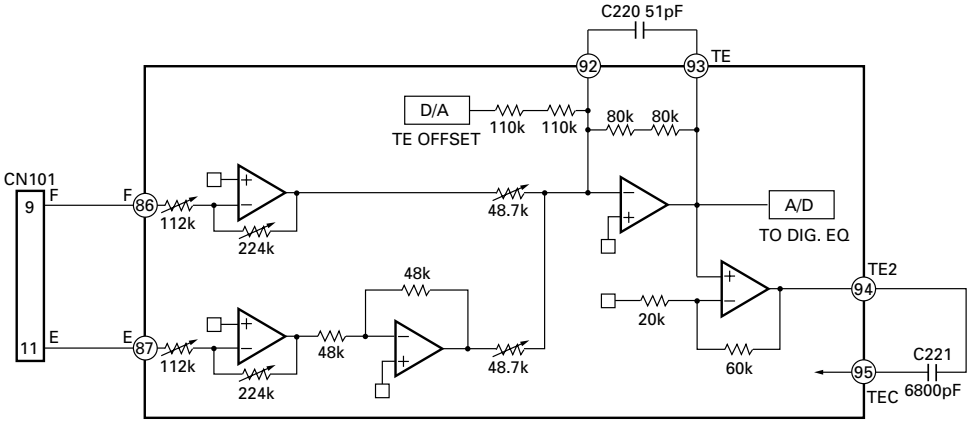


Fig.5 TRACKING ERROR AMPLIFIER AND TRACKING ZERO CROSSING AMPLIFIER

7) DFCT (Defect) Circuit

The DFCT signal is used for detecting defects on the mirrored disc surface. It allows monitoring from the HOLD pin (Pin 2). It goes high when defects are found on the mirrored surface.

The DFCT signal is generated by comparing the RF amplified signal (which is obtained by bottom holding the RFO signal) at a specific threshold level by the succeeding digital section.

Stains or scratches on the disc can constitute the defects on the mirrored disc surface. Thus, as long as the DFCT signal remains high in the LSI, the focus and tracking servo drives are held in the current state so that a better defect prevention may be ensured.

8) 3TOUT Circuit

The 3TOUT signal is generated by entering disturbance to the focus servo loop, comparing phase of fluctuations of the RF signal 3T component against that of the FE signal at that time, then converting the signal to DC level. This signal is used for adjusting bias of the FE signal (to be described later). This signal is not output from the LSI, thus its monitoring is not available.

9) MIRR (Mirror) Circuit

The MIRR signal shows the on track and off track data, and is output from Pin 3.

When the laser beam is

On track : MIRR = "L"

Off track : MIRR = "H"

This signal is used on the brake circuit (to be described later) and also as the trigger to turn on track counting when jumping take place.

The MIRR signal is supplied to the micro computer, too, for the protection purpose.

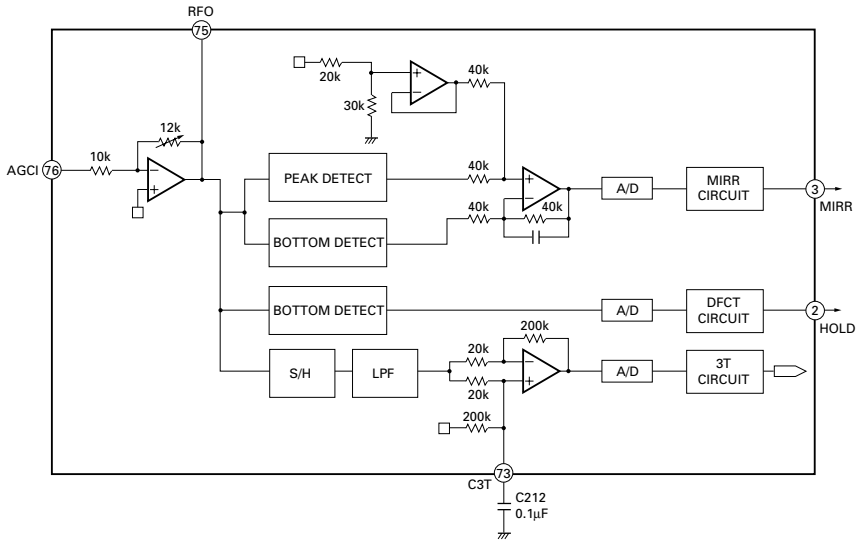


Fig.6 : DFCT, MIRR AND 3T DETECTION CIRCUIT

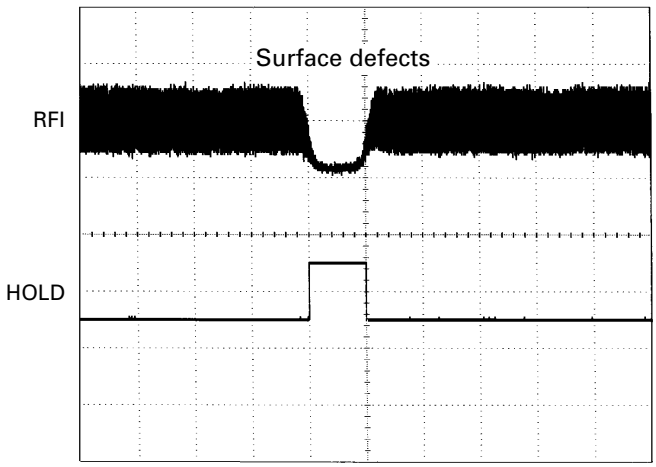


Fig.7 : HOLD OUTPUT WAVEFORM
(When surface defects are present)

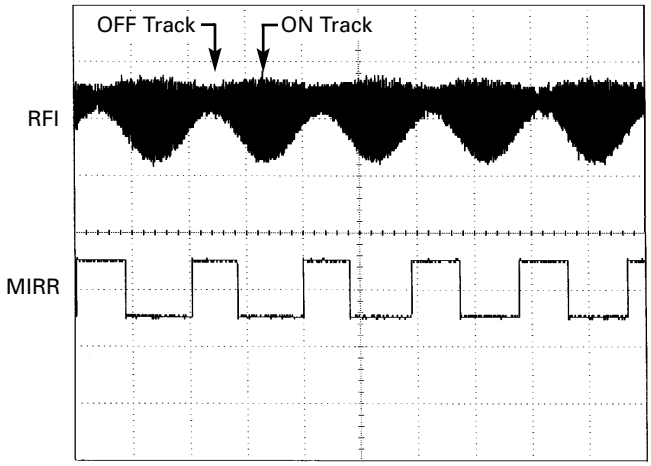


Fig.8 : MIRR OUTPUT WAVEFORM
(When an access is made)

10) EFM Circuit

This circuit is used for converting the RF signal to digital signal consisting of "0" and "1". The RFO signal from Pin 75 is externally AC coupled, entered to Pin 74, then applied to the EFM circuit.

Loss of the RF signal due to scratches or stains on the disc, or vertical asymmetry of the RF due to variations in the discs manufactured can't be eliminated by AC coupling alone. This circuit, therefore, controls the reference voltage ASY on the EFM comparator by use of the fact that "0" and "1" appear fifty fifty in the EFM signal. By this arrangement, the comparate level is constantly maintained at almost center of the RFO signal level. The reference voltage ASY is generated when the EFM comparator output is passed through the low pass filter. The EFM signal is output from Pin 71. It is a 2.5 Vp-p amplitude signal centering on REFO.

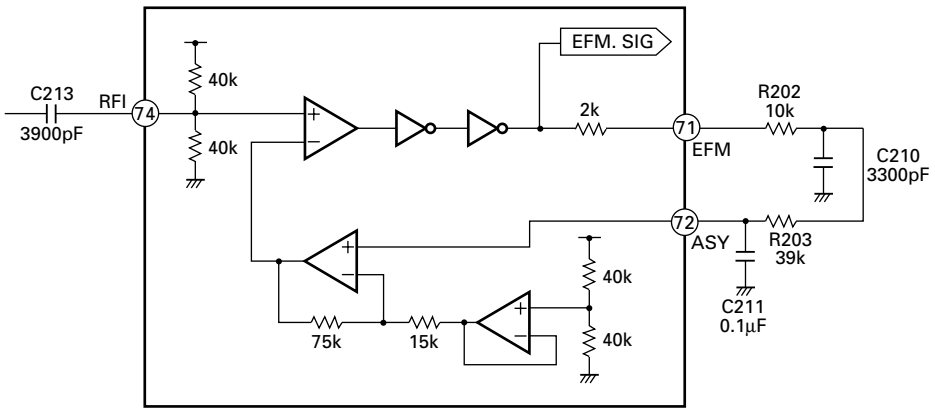


Fig.9 : EFM CIRCUIT

1.2 SERVO SECTION (UPD63711GC : IC201)

The servo section controls the operations such as error signal equalizing, in focus, track jump and carriage move. The DSP is the signal processing section used for data decoding, error correction and interpolation processing, among others.

This circuit implements analog to digital conversion of the FE and TE signals generated on the pre-amplifier, then outputs them through the servo block as the drive signal used on the focus, tracking and carriage system. The EFM signal is decoded on the signal processing section and finally output via the D/A converter as the audio signal. The decoding process also generates the spindle servo error signals which is fed to the spindle servo block to generate the spindle drive signal.

The focus, tracking, carriage and spindle drive signals are then amplified on the driver IC BA5985FM (IC301) and fed to respective actuators and motors.

1) Focus Servo System

The focus servo main equalizer is consisted of the digital equalizer. Fig.10 shows the focus servo block diagram.

When implementing the focus close on the focus servo system, the lens must be brought within the in-focus range. Therefore, the lens is moved up and down according to the triangular focus search voltage to find the focus point. During this time, the spindle motor is kicked and kept rotating as a set speed.

The servo LSI monitors the FE and RFOK signals and automatically carries out the focus close at an appropriate point.

The focus closing is carried out when the following three conditions are met :

① The lens approaches the disc from its current position.

② RFOK = "H"

③ The FZC signal is latched at high after it has once crossed the threshold set on the FZD register (Edge of the FZD).

As the result, the FE (= REFO) is forced to low.

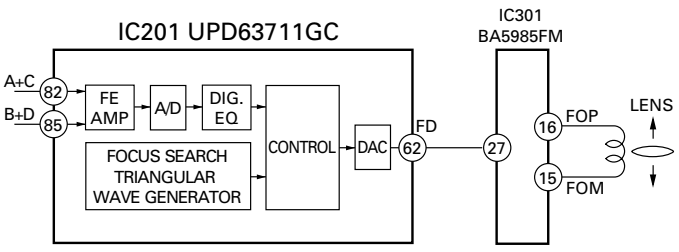


Fig.10 : FOCUS SERVO BLOCK DIAGRAM

When the above conditions are all met and the focus is closed, the XSI pin goes to low from the current high, then 40 ms later, the microcomputer begins to monitor the RFOK signal after it that has been passed through the low pass filter.

When the RFOK signal is recognized as low, the micro computer carries out various actions including protection.

Fig.11 a series of operations carried out relevant to the focus close (the figure shows the case where focus close is not available).

You can check the S-curve, search voltage and actual lens behavior by selecting the Display 01 for the focus mode select in the test mode, and then pressing the focus close button.

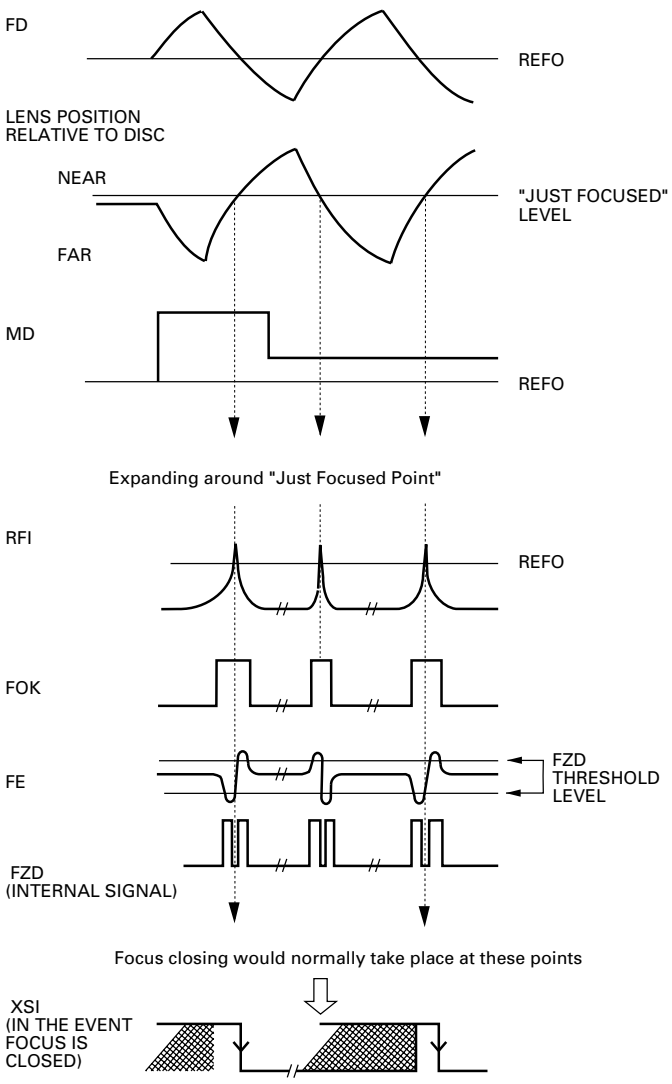


Fig.11 : FOCUS CLOSE SEQUENCE

2) Tracking Servo System

The digital equalizer is employed for the main equalizer on the tracking servo. Fig.12 shows the tracking servo block diagram.

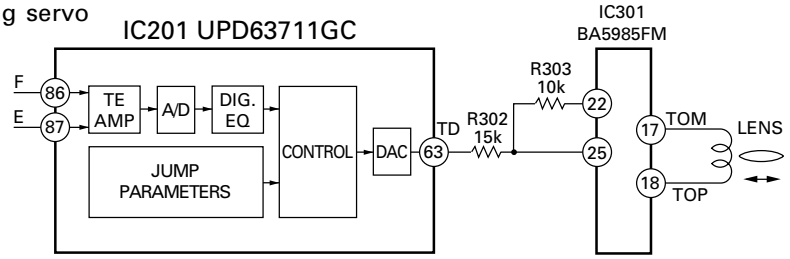


Fig.12 : TRACKING SERVO BLOCK DIAGRAM

a) Track jump

When the LSI receives the track jump command from the microcomputer, the operation is carried out automatically by the auto sequence function of the LSI. This system has five types of track jumps used for the search : 1, 4, 10, 32 and 32 × 3. In the test mode, in addition to three jumps (1, 32 and 32 × 3), move of the carriage can be check by mode selection. For track jumps, the microcomputer sets almost half of tracks (5 tracks for 10 tracks, for instance) and counts the set number of tracks using the TEC signals. When the microcomputer has counted the set number of tracks, it outputs the brake pulse for a fixed period of time (duration can be specified with the command) to stop the lens. In this way, the tracking is closed and normal play is continued.

To improve the servo loop retracting performance just after the track jump, the brake circuit is turned on for 50 ms after the brake pulse has been terminated to increase gain of the tracking servo.

Fast forward and reverse operations are realized by through consecutive signal track jumps. The speed is about 10 times as fast as that in the normal mode.

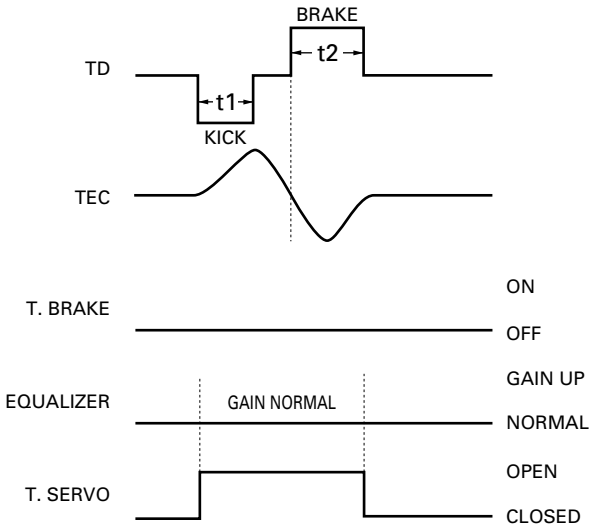


Fig.13 : SINGLE TRACK JUMP

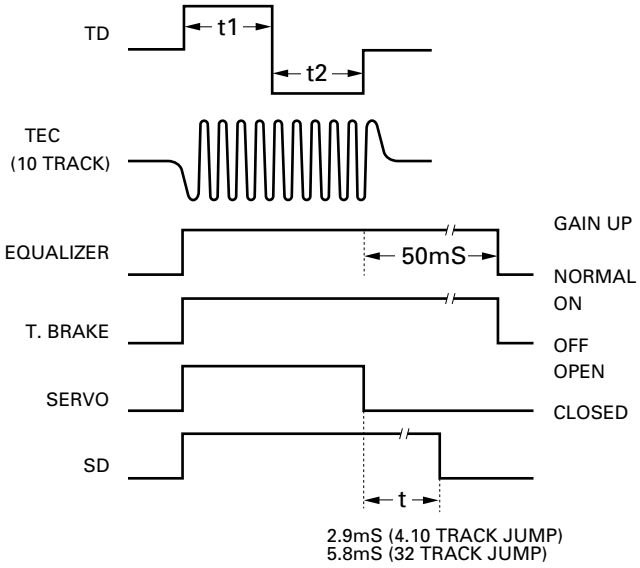
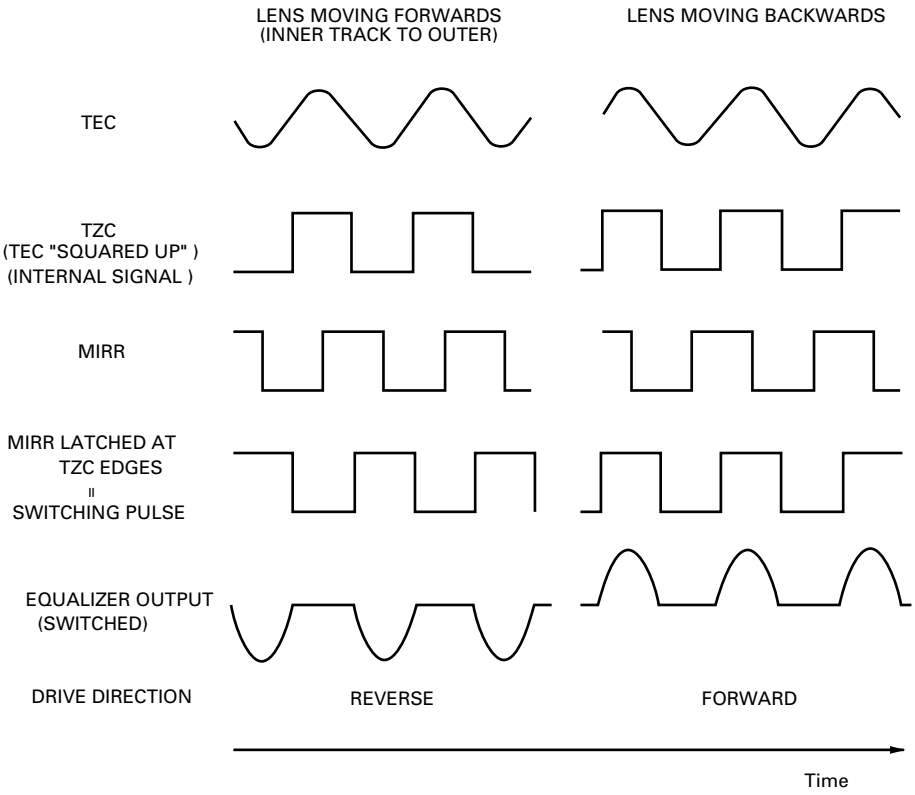


Fig.14 : MULTI-TRACK JUMP

b) Brake Circuit

The servo retracting performance can be deteriorate during the setup or track jump operation. In this connection, the brake circuit is used to ensure steady retract of the tracking servo. The brake circuit detects in which direction the lens is moving, then slows down its move by outputting the drive signal that moves the lens into the opposite direction alone. Track slippage direction is determined by referencing the TEC and MIRR signals and their phase.



Note : Equalizer output assumed to hava same phase as TEC.

Fig.15 : TRACKING BRAKE CIRCUIT

3) Carriage Servo System

The carriage servo supplies the tracking equalizer's low-frequency component (lens position data) output to the carriage equalizer, then, after providing a fixed amount of gain to it, outputs the drive signal from the LSI. This signal is then applied to the carriage motor via the driver IC.

When the lens offset reaches a certain level during play, the entire pickup must be moved into the forward direction. Therefore, the equalizer gain is set to the level that allows to generate a voltage higher than the carriage motor starting voltage. In actual operations, a certain threshold level is set for the equalizer output by the servo LSI so that the drive voltage may be output from the servo LSI only when the equalizer output exceeds the threshold level. This arrangement helps reducing power consumption. Also, due to disc eccentricity or other factors, the equalizer output may cross the threshold level a number of times. In this case, the drive voltage output from the LSI will have pulse-like waveform.

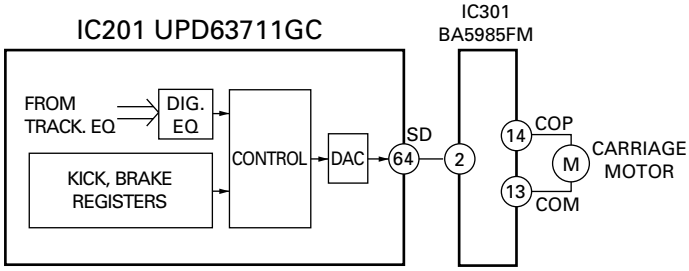


Fig.16 : CARRIAGE SERVO BLOCK DIAGRAM

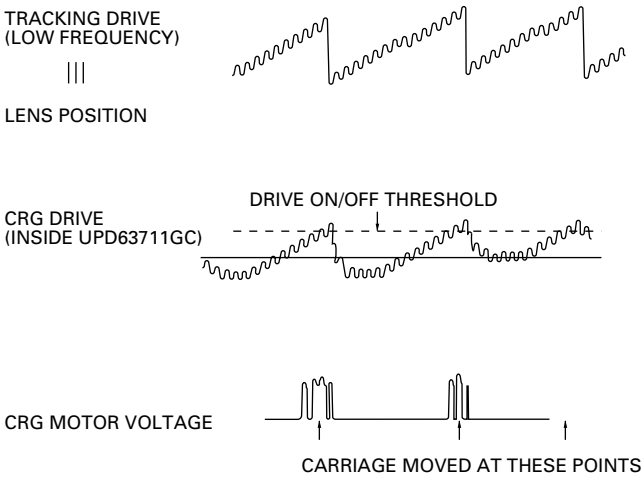


Fig.17 : CARRIAGE SIGNAL WAVEFORM

4) Spindle Servo System

The spindle servo has the following modes.

① Kick :

This mode is used for accelerating the disc rotation during setup.

② Offset :

(a) After the kick is over in the setup, this mode is turned on until changing to rough servo mode.

(b) When focus is lost during play, this mode is turned on until the focus is restored.

Both of the above are used for maintaining the disc rotation rate near to the specified rate.

③ Applicable servo :

The CLV servo mode is turned on for the normal operations.

In the EFM demodulation block, the frame sync signal and internal counter output signal are sampled for every WFCK/16 and a signal is produced for indicating whether or not they are matching.

They are determined to be asynchronous only when this signal fails to match 8 times in succession. In all other cases, above two signals are assumed to be synchronous. In the applicable servo mode, the retracting servo is automatically selected if the two signals are synchronous. If not, the regular servo is automatically selected.

④ Brake :

This mode is turned on when stopping the spindle motor.

The microcomputer outputs the brake voltage through the servo LSI. The LSI monitors the EFM waveform and, if its longest pattern exceeds a certain interval (if the rotation is sufficiently slow), the flag is set the LSI and the microcomputer turns off the brake voltage. When the flag is not up within a specified period time, the microcomputer switches the mode from the brake to the stop mode, and maintains this mode for a fixed period of time. If this stop mode is continued for a fixed period of time, the disc will be ejected.

⑤ Stop :

This mode is used for powering on the system and the eject operation. When this mode is turned on, voltage across the spindle motor is 0V.

⑥ Rough servo :

This mode is used for when the carriage feed (carriage mode for the long search, etc.) is turned on. The linear speed is calculated from the EFM waveform and high or low level is entered to the spindle equalizer. In the test mode, this mode is also used for the grating check.

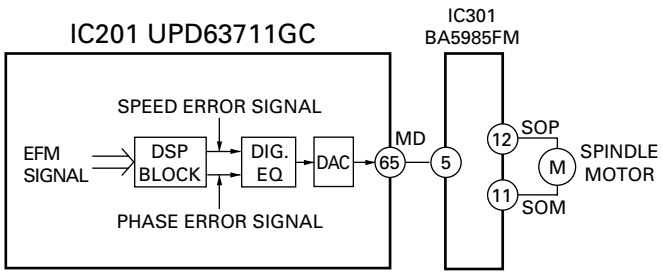


Fig.18 : SPINDLE SERVO MOTOR BLOCK DIAGRAM

1.3 AUTOMATIC ADJUSTMENT FUNCTIONS

Every circuit adjustment on the CD-LSI of this system is automated.
Every circuit adjustment is automatically implemented when the disc is inserted or the CD mode is selected from the source key. The following describes how the adjustments are executed.

1) FZD Cancel Setting

This setting is used for executing the focus close operation without fail.
When power is turned on, the FE offset level is read and a voltage opposite to this offset value is written to the CRAM on the IC to cancel the offset. In this manner, the FZD threshold level can be set to a constant value (+240mV), thereby ensuring to meet one of the requirements for the IC to execute the focus close that "the FZD signal is latched at high".

2) Automatic Adjustment of TE, FE and RF Offset

Using REFO as the reference, this function adjusts the pre-amp TE, FE and RF offsets to the respective target value when power is turned on (targets values of the TE, FE and RF are 0, 0 and –1V, respectively).
The following is the adjustment procedure :

(1) Respective offset (LD off) is read by the microcomputer via the servo LSI.
(2) The microcomputer calculates the voltages to be corrected from the read values, then sets them to the specified field.

3) Automatic Adjustment of Tracking Balance (T. BAL)

This adjustment is used for eliminating differences between the pickup E and F channels outputs by adjusting gain of the amplifier on the LSI. In the actual operation, the TE waveform is adjusted so that it may be vertically symmetric with REFO.
The following is the adjustment procedure :

(1) Make sure the focus close is complete.
(2) Kick the lens in the radial direction to generate the TE waveform.
(3) At this time, the microcomputer reads the TE signal offset value (via the servo LSI) being calculated by the LSI.
(4) The microcomputer determines if the read offset value is positive, negative or zero.
If the offset value = 0, the adjustment is terminated.
If the offset value = A positive or negative value, gain of the E and F channels amplifiers are modified according the predetermined rule.

Then above steps (2) through (4) are repeated until the "Offset value = 0" or "Specified limit count" is reached.

4) Automatic Adjustment of FE Bias

This adjustment is intended at maximizing the RFI level by optimizing the focus point in-play. This adjustment utilizes the phase difference between the RF waveform 3T level and the focus error signal when disturbance is applied.
Since disturbance is applied to the focus loop, this adjustment is designed to take place in the same timing as the auto gain control (to be described later).
The following is the adjustment procedure :

(1) Disturbance is injected to the focus loop by the command from the microcomputer (within the servo LSI).
(2) The LSI detects fluctuation of the RF signal 3T component level.
(3) The LSI determines relationship between fluctuation of the 3T component and the injected disturbance to detect magnitude and direction of the off-focus introduced.
(4) The microcomputer reads the detected results from the LSI.
(5) The microcomputer calculates necessary correction, then hands the calculated value to the bias adjustment term set on the LSI.

This adjustment is repeated several times, as it is so with the auto gain control, to ensure higher accuracy.

5) Focus and Tracking Automatic Gain Control

This function is used for implementing automatic control of the focus and tracking loop gain.

The following is the adjustment procedure :

(1) Inject disturbance to the servo loop.

(2) Extract the error signal (FE and TE) generated at when the disturbance is applied to obtain the signals G1 and G2 via the B.P.F.

(3) The microcomputer reads the G1 and G2 signals via the LSI.

(4) Based on the necessary correction calculated by the microcomputer, the LSI performs the loop gain adjustment.

Above adjustments are repeated several times to ensure higher adjustment accuracy.

6) Automatic RF Level Adjustment (RFAGC)

This adjustment is used for implementing intended signal transmission successfully by adjusting unevenness of the RF signal (RFO) levels, that results from disc and machine relevant factors, to a target value. The adjustment is actually done by varying gain of the amplifier provided between the RFI and RFO.

The following is the adjustment procedure :

(1) Using the command, the microcomputer reads the output from the RF level detection circuit on the servo LSI.

(2) Based on the read value, the microcomputer calculates an amplifier gain that will produce the target RFO level.

(3) The microcomputer sends the corresponding command to the servo LSI so that the above gain value may be set.

This adjustment takes place at the following timing :

- When the focus close alone is completed during the setup process.
- Just before the setup is completed (just before the play takes place).
- After the off-focus has been corrected during the play.

7) Adjustment of Pre-Amp Stage Gain

It is used for adjusting the entire RFAMP (FE, TE and RF amplifiers) to +6dB or +12dB depending on given gain level when reflected light from the disc is significantly below the required level due to stained lens. This phenomena can be noticed when playing back the CD-RW.

The following is the adjustment procedure :

When reflected light from disc is judged to be significantly below the required level during the setup, set the entire RFAMP to +6dB or +12dB. In this case, if the gain is modified, the setup have to be repeated from the first step.

Through the adjustment, if you judged the play becomes available by setting the entire RFAMP to +6dB, +6dB should be selected for the setup next time on.

See the figure below :

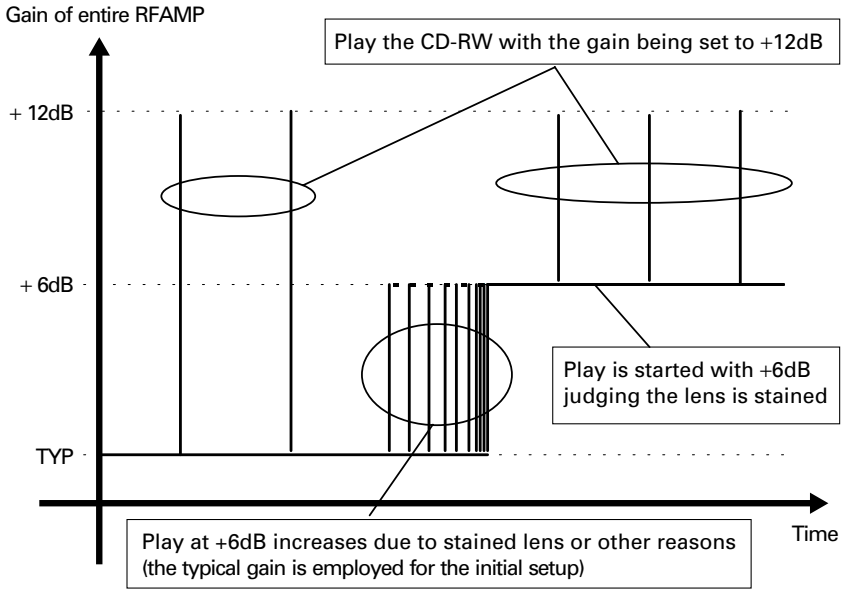


Fig.19 : CONCEPTUAL DIAGRAM OF PRE-AMP GAIN ADJUSTMENT

8) Initial Adjusting Values

All the automatic adjustments are implemented using the previous adjustment values as the initial values unless the microcomputer power (the backup power) is not turned off (though there are some exceptions).
When the backup is turned off, automatic adjustment is executed based on the initial values rather than the previous adjustment values.

9) Displaying Coefficients After Adjustment

You can display and check results of some automatic adjustments (FE and RF offset, FZD cancel and F / T / RFAGC) from the test mode. The following coefficients are displayed in each automatic adjustment :

(1) FE and RF offset and FZD cancel

Reference value = 32 (The coefficient of 32 indicates that no adjustment was required).

The results are displayed in multiples of approximately 40 mV.

An example : When FZD cancel coefficient = 35

35 – 32 = 3

3 × 40 mV = 120 mV

Since the corrected value is approximately +120 mV, the FE offset before adjustment was –120 mV.

(2) F and T gain adjustment

Reference value = Focus/Tracking = 20

A coefficient displayed indicates an amount of adjustment conducted on the reference value.

An example : When AGC coefficient = 40

40/20 = Overall gain has bee doubled (+6dB). (The original loop gain of 1/2 has been doubled to have the targeted overall gain.)

(3) RF level adjustment (RFAGC)

Reference value = 8

Coefficient = 9 to 15 ····· The direction in which the RF level is increased (the gain is increased).

Coefficient = 7 to 0 ····· The direction in which the RF level is decreased (the gain is decreased).

Incrementing or decreasing the coefficient by "1" varies the gain by 0.7 to 1dB.

Maximum gain = Typically +6.5dB. Coefficient at this time is 15.

Minimum gain = Typically –6.0dB. Coefficient at this time is 0.

1.4 POWER SUPPLY AND LOADING SECTION

The power supply of the system uses VD (8.3V) from the mother board. VD is fed to 5 channel CD driver IC, 5V Reg IC and disc detection LED.

The microcomputer turns on or off the CD driver and the 5V using "CONT" and "CD5VON", respectively. The loading drive is turned on or off by the input signals "CDEJET" and "CDLOAD". No control terminal is provided for turning the loading drive on or off.

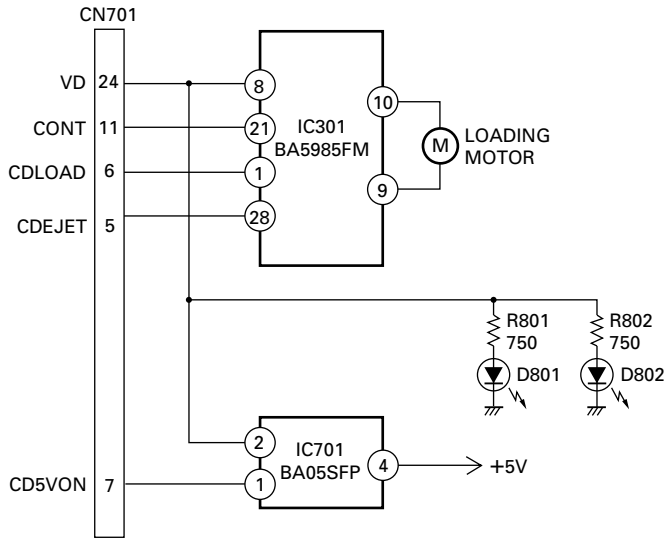
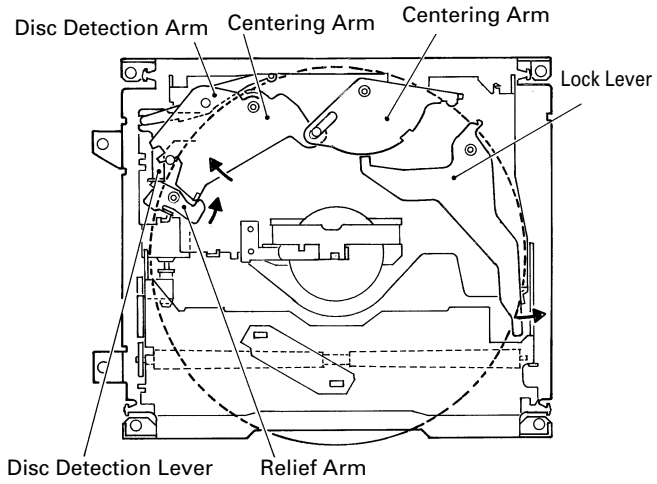


Fig.20 : POWER SUPPLY AND LOADING SECTION

2. MECHANISM DESCRIPTIONS

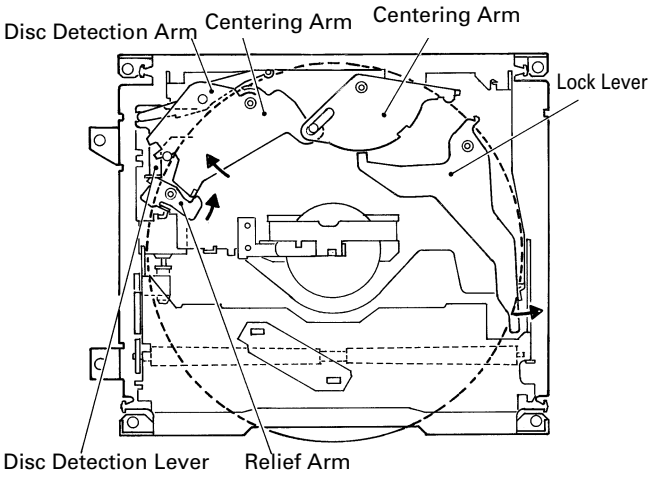
● Loading Operation (when a 12 cm disc is used)

1. Insert a 12 cm disc (the sensor turns on the motor revolution).
2. The disc pushes the Lock Lever in, thereby resetting the lock currently applied to the Centering Arms.
3. The disc further pushes the Centering Arms in.
4. The right side and left side arms are engaged to perform centering of the disc.
5. The disc pushes the Disc Detection Arm in, thereby pushing the Disc Detection Lever forward.
6. Clamping action retracts the Disc Detection Lever toward forward side, thereby rotating the Relief Arm.
7. The Relief Arm further pushes the Centering Arm in, thus detaching it from the disc.



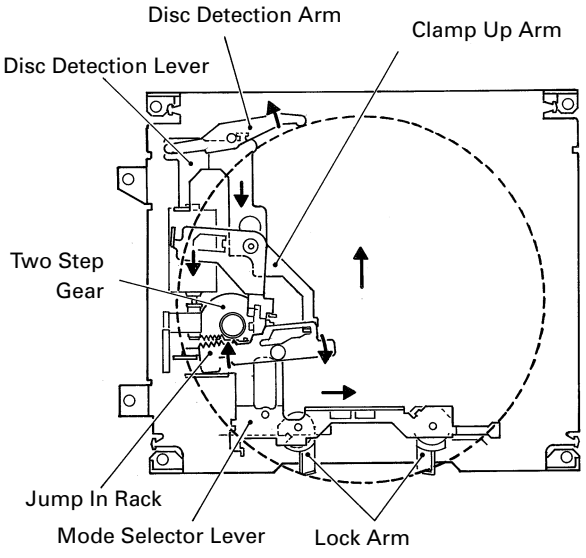
● Loading Operation (when a 8 cm disc is used)

1. Insert an 8 cm disc (the sensor turns on the motor revolution).
2. The disc does not contact against the Lock Lever, thus centering of the disc is performed by the Centering Arm being locked.
3. When the right side slot is used, the lock currently applied to the Centering Arm remains turned on even if the disc may touch the Lock Lever because the disc leaves the lever before it reaches the Centering Arm.
4. Succeeding procedures are the same as that for 12 cm discs.



● Clamping Operation

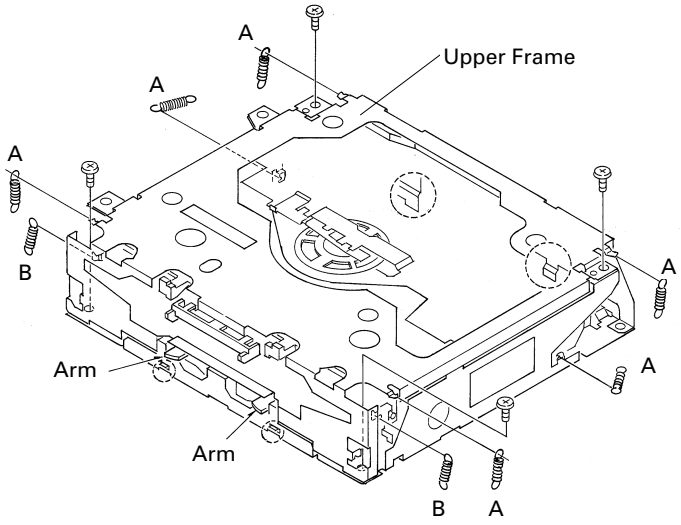
1. Insert a disc.
2. The Detection Arm pushed forward by the Detection Lever turns on rotation of the Jump In Rack.
3. The Jump In Rack then engages with the Two Step Gear and moves toward right.
4. At the same time, the Mode Selector Lever connected to the Jump In Rack starts moving toward right, thereby rotating the Lock Arm and resetting the mechanical lock. The Clamp Up Arm too is rotated by the above action and, thus, the Clamp Up Arm now being lifted by shape of the cam of the Clamp Arm is lowered.
   And, the Guide Arm is also moved down because of shape of the cam of the Mode Selector Lever.
5. By use of the cam shape, the Jump In Rack being moved toward right retracts the Disc Detection Lever in forward direction, thereby turning on rotation of the Relief Arm.



3. DISASSEMBLY

● Removing the Upper Frame

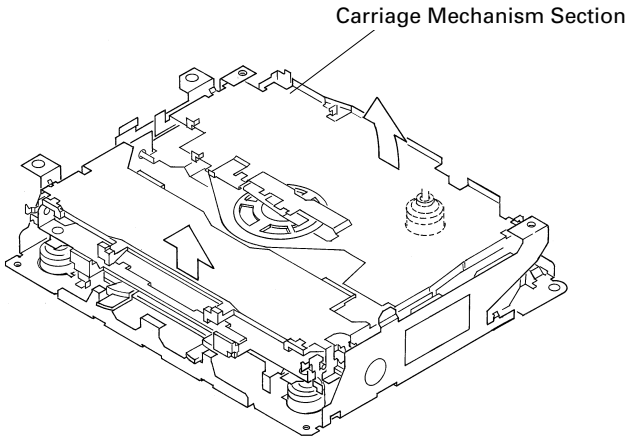
1. Remove six Springs A, two Springs B and four Screws.
2. Remove two Tabs situated on rear side of the Upper Frame, remove two Arms on the front side, then remove two Tabs on the front side.



● Removing the Carriage Mechanism

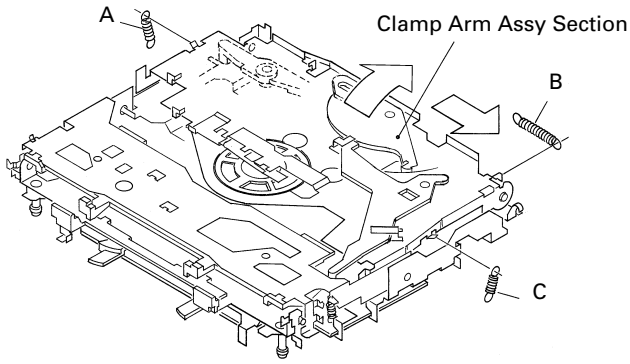
1. Disengage the Carriage Mechanism from the two dampers situated in the front side by driving it up, then disengage and remove the mechanism from the two dampers by driving it up aslant into front side direction.

Note : When assembling the Carriage Mechanism, coat the dampers with alcohol prior to the assembly.



● Removing the Clamp Arm Assy

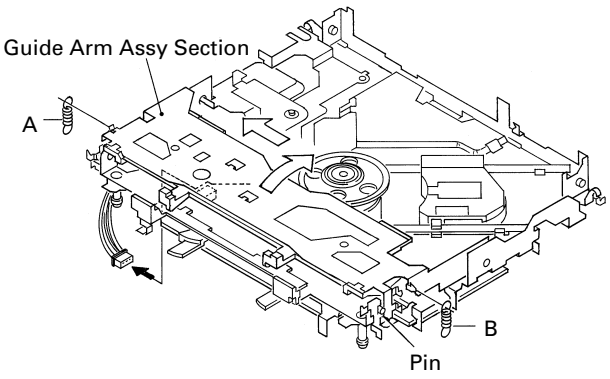
1. Remove a Spring A, a B and a Spring C.
2. Drive the Clamp Arm Assy up into rear side direction, then disengage the arm from its current position Finally, drive the assembly approximately 45 degrees upward, then slide the assembly toward right side to remove it.



● Removing the Guide Arm Assy

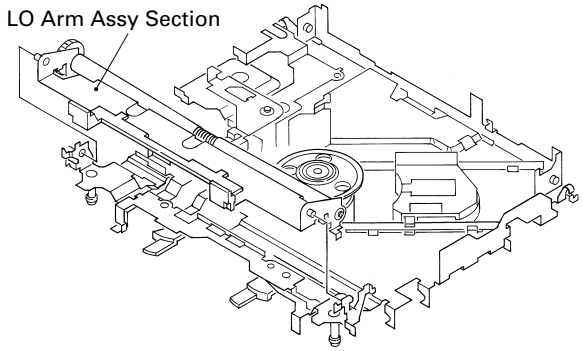
1. Remove a connector, a spring A and B
2. Drive the Guide Arm Assy up aslant into rear side direction, then remove it from a Pin. Finally, drive the assembly approximately 45 degrees upward, then slide the assembly toward left side to remove it.

Note : When assembling the guide arm assembly, route the cord inside the assembly. In this operation, care must be exercised so that cord may be caught by the gear.



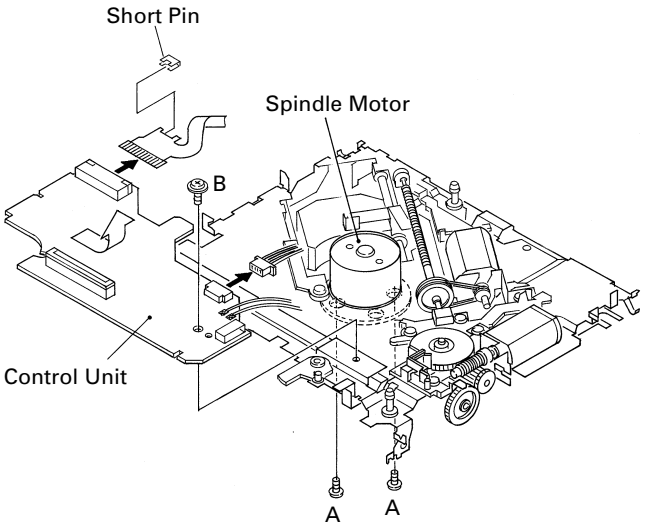
● Removing the LO Arm Assy

1. Remove two Pins to dismount the LO Arm Assy.



● Removing the Control Unit and the Spindle Motor

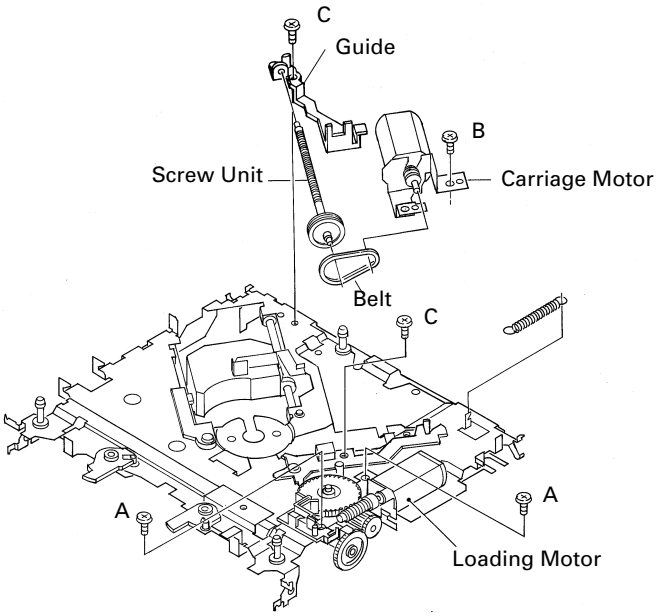
1. Remove from the connector after mounting the short pin on the flexible PCB of the pickup unit.
2. Remove two Soldered joints, then remove two Screws A.
3. Remove two connectors and a Screw B.
4. Disengage the Control Unit from two Tabs, then dismount the unit by sliding it toward left.
5. Dismount the Spindle Motor.



● Removing the Loading Motor and Carriage Motor

1. Remove the Spring and two Screws A.
2. Dismount the Loading Motor.
3. Remove the Belt, a Screw B, two Screws C, a Guide and a Screw Unit.
4. Dismount the Carriage Motor.

Note : When assembling the Belt, use care so that it may not be contaminated by grease.



● Removing the Pickup Unit

1. Remove two Screws and a Shaft.
2. Dismount the Pickup Unit.